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STYLOPS

A JOURNAL OF

TAXONOMIC ENTOMOLOGY

VOL. 1

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STYLOPS

A JOURNAL OF TAXONOMIC ENTOMOLOGY

VOLUME 1. 1932.

NEW SOUTH AFRICAN CURCULIONIDAE (COL.).

By SIR GUY MARSHALL, C.M.G., D.Sc., F.R.S.

Subfamily ATTELABINAE.

Attelabus (Pleurolabus) munroi, sp. n. (Fig. 1.)

Entirely black, moderately shiny; the claws (except at base) and the uncus of the tibiae usually reddish yellow.

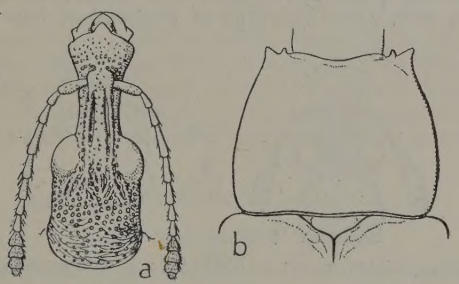


FIG. 1.—*Attelabus munroi*, sp. n.; *a*, head of ♂; *b*, prothorax of ♂.

♂. *Head* (fig. 1, *a*) longer than broad (4 : 3), parallel-sided, with the eyes only very slightly projecting, coarsely punctate, the punctures being larger and longitudinally confluent anteriorly, the vertex finely transversely striolate and with sparser punctures; the eyes longitudinally elongate, their length a little greater than the width of the forehead. *Rostrum* nearly as long as the head, about twice as long as its apical width, coarsely and closely punctate throughout, bisulcate dorsally behind the antennae, the inter-antennal area strongly elevated and longitudinally convex; the epistome conically produced, the submentum without any process, the mandibles with a sharp angulation on the outer edge near the base. *Antennae* inserted at the middle of the rostrum, very elongate (over 2·5 mm.); the scape three times as long as broad; the funicle with all the joints longer than broad, 3 very elongate and nearly as long as 1 + 2, 7 as long as joint 1 of the club but much narrower; the two basal joints of the club subequal, transverse. *Prothorax* (fig. 1, *b*) broader than long (13 : 10), gently rounded at the sides, widest at one-third from the base, gradually narrowing to the sharply conical anterior angles, which project forwards, and internally to them a second smaller sharper tooth arising from the apical margin, which is shallowly sinuate dorsally (in one small ♂ the projecting teeth are almost equal and the dorsal sinuation much deeper); dorsum rugosely punctate, the punctures transversely and longitudinally confluent, forming concentric curved ridges. *Scutellum* widely triangular, with a suboblong raised area in the middle bearing fine sparse punctures. *Elytra* slightly longer than broad (1·15 : 1), a little wider at the shoulders than the pro-

thorax, with deep regular striae containing shallow punctures; the intervals well marked, convex, with rather strong irregular subrugose punctures, which become smaller and sparser near the apex. *Legs* with the femora shallowly strigose, scarcely punctate; tibiae carinulate, with the apical margin very oblique, the front pair moderately curved; tarsi with joint 2 transverse. *Prosternum* anteriorly as long as the coxae.

♀. *Head* much shorter (3·3 : 3); the length of the eyes equal to the width of the forehead. *Rostrum* much shorter, length : apical width : : 7 : 5; inter-antennal area much less convex; mandibles with the external angulation rounded. *Antennae* inserted behind the middle, much shorter than in ♂ (1·5 mm.); the scape twice as long as broad; joint 3 of the funicle much shorter than 1 + 2, 7 as broad as long, 6 only slightly longer. *Prothorax* more narrowed in front, without any projections at the anterior angles, the dorsal apical margin not sinuate. *Prosternum* anteriorly very short.

Length, 4·1–5·7 mm.; breadth, 2·1–2·5 mm.

Natal: Malvern, 1 ♂, vi.1897 (*G.A.K.M.*). Cape Province: East London, on *Harpephyllum caffrum*, 4 ♂♂, 4 ♀♀, i.1925 (*H. K. Munro*—type).

The small males have the sexual characters more or less intermediate between those of the large male described above and those of the female.

The female of this species is very similar in general facies to both sexes of *A.* (*P.*) *exaratus*, Boh. 1829, the type of *Pleurolabus*, but the latter insect

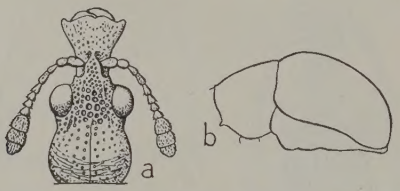


Fig. 2.—*Attelabus spectator*, sp. n.; *a*, head of ♂; *b*, outline of thorax and elytra.

differs *inter alia* in its blue colour, subconical head and non-projecting eyes; the rostrum is finely punctate, the epistome not produced, and the male has a process on the submentum; joints 6 and 7 of the funicle are transverse; the prothorax has no teeth at the anterior angles in the male, and the dorsal striolation is transverse and not concentric; the intervals of the elytra are subsulcate and bear a single regular row of punctures.

Previous descriptions have omitted any reference to the fact that the males of the species of *Pleurolabus* have a small tooth on each side of the front margin of the prosternum.

Attelabus (Pleurolabus) spectator, sp. n. (Fig. 2.)

♂. Colour dark blue, the elytra with purplish reflections.

Head (fig. 2, *a*) narrowed from the base to the middle, then widening to the eyes, which are very prominent and semicircular, their length being less than the width of the forehead, which is coarsely and rugosely punctate. *Rostrum* a little longer than its apical width (6 : 5), parallel-sided and narrower than the forehead in its basal half, very strongly dilated in front, the genae slightly produced anteriorly in a blunt angle; the epistome with a small median emargination, the submentum with a large subquadrate laminate process. *Antennae* stout, the scape 1·5 times as long as broad; joints of the funicle in order of length: 3, 1, (4, 2), 5, 6, 7; joints 1–4 longer than broad, 5 as long as broad, 6–7 transverse; the two basal joints of the club transverse, but 1 longer than 2. *Prothorax*

broader than long (3 : 2), subconical, widest at the base, narrowing anteriorly with a slight curve, and with a shallow constriction at the apex; the base and apex subtruncate the gular margin with a small sharp tooth on each side; the dorsum sloping steeply forwards, highest at the base, coarsely subreticulately punctate, the punctures transversely confluent only near the base and apex. *Scutellum* triangular, longer than usual, coarsely and closely punctate, the higher median oval area not sulcate. *Elytra* short, almost as broad as long, widest at the shoulders, gradually narrowing behind, with well-marked striae, containing dense shallow indistinct punctures; the intervals flat, each with a single row of strong close punctures; the dorsal outline unusually convex, forming with the pronotum a continuous strong curve, which is highest just behind the scutellum and almost perpendicular near the apex. *Legs* with the femora closely and strongly punctate in the apical half, sparsely so elsewhere; the front tibiae almost straight; joint 2 of the tarsi as long as its apical width. *Prosternum* anteriorly as long as the coxae.

Length, 4·5 mm.; breadth, 2·4 mm.

Southern Rhodesia: Bulawayo, 1 ♂, xii.1903 (*P. A. Sheppard*).

A very distinct species, differing from all the known members of the subgenus *Pleurolabus* in its very prominent eyes, wide forehead, angulated genae, and convex elytra.

In Voss' catalogue the forms of *A.* (*Pleurolabus*) *algoensis*, Pér., are treated as distinct species, but I prefer to follow Hustache in regarding them as geographical races. The typical form is common in Southern Rhodesia and is broader than any of the others; a slightly narrower form, *cyaneoviridis*, Hust., occurs in S.E. Belgian Congo; a still narrower one, *protensus*, Voss, in Nyasaland and Tanganyika; and this is replaced further north by *abyssinicus*, Hust.

Subfamily Apioninae.

Apion penicillatum, sp. n.

♂♀. Derm piceous brown, opaque, with sparse recumbent fulvous setae and a few whitish ones; elytra each with three small tufts of erect setae, and a macular transverse whitish band on the declivity.

Head with a shallow transverse impression just behind the eyes containing strong setigerous punctures; vertex shining, impunctate; eyes large, coarsely facetted, very convex, deepest a little behind the middle; forehead flattened, impunctate, opaque, densely setose at the sides and bare in the middle. *Rostrum* deflected, slightly curved, strongly and subangularly dilated at the base, thence cylindrical to the apex, the antennae being inserted close to the base; in ♂, longer than the prothorax (7 : 6), opaque, with small shallow separated punctures, and with sparse fulvous setae from the base to two-thirds; in ♀, much longer than the prothorax (9·5 : 6), strongly punctate in front of the opaque basal area, but very shiny and with sparse minute punctures on the apical half, the fulvous setae confined to the basal half. *Antennae* very stout, black or piceous, with fairly dense stiff recumbent fulvous setae, which are more numerous on the apical half of the first funicular joint; scape as long as the two succeeding joints; funicle not widening distally, joint 1 as long as broad, the remainder transverse, the distal ones becoming shorter; club ovate, acuminate, slightly compressed. *Prothorax* broader than long (4 : 3), moderately rounded at the sides, widest behind the middle, broadly constricted laterally at the apex; the basal margin deeply bisinuate, much broader than the truncate apex; dorsum longitudinally convex, highest behind the middle, with large close punctures, each containing a long recumbent forwardly-directed fulvous seta, and a deep median basal fovea which is continued to about the middle as a shallow furrow; the apical margin with a fringe of horizontally projecting fulvous setae. *Scutellum* ovate, opaque, shallowly

impressed. *Elytra* subquadrate, with strongly projecting rounded shoulders, subparallel-sided to beyond the middle, longer than broad (13 : 10), with broad deep sulci containing large separated punctures; the intervals costate, about as broad as the sulci, equally raised, finely rugulose; int. 1 with a small erect tuft of setae about the middle which is usually fulvous in front and black behind; a similar fulvous tuft before the middle on int. 5, and a blackish tuft (sometimes fulvous) at the top of the declivity on int. 3. *Legs* stout, piceous or black, fairly densely clothed (including tarsi) with long recumbent fulvous and white setae; the hind femora with a transversely carinulate bare area on the inner face; tibiae gradually widening to the apex, straight on the lower edge; tarsi with joint 1 as long as 2 + 3, 2 transverse, 4 very short, only slightly exceeding 3, the claws divaricate and appendiculate.

Length, 2·5–3·4 mm.; breadth, 1·3–1·7 mm.

Cape Province: Kologha, King William's Town, 6 ♂♂, 5 ♀♀, vi.–viii.1931.

This species has been bred from the seeds of knobwood (*Fagara* sp.), of which it is stated to destroy a large percentage.

The only other described African *Apion* with tufts of setae on the elytra is *A. fasciculatus*, Boh. 1845, from Durban, which is known to me from the description only. It differs from *penicillatum* in the following points: eyes not prominent; antennae slender; prothorax subconical, a little longer than its basal width, and with the sides straight; elytra with grey scaling and with a denuded subtriangular lateral patch on each; legs testaceous, with dense white setae, the tarsi and apex of the tibiae being fuscous.

A. penicillatum presents the following well-marked varietal forms.

A. penicillatum var. **leptorrhinum**, n.

Differs from the typical form only in having a notably longer and more slender rostrum, which is specially striking in the ♀, the rostrum being much longer than the head and pronotum together (10 : 7), whereas the proportion in the typical ♀ is 8 : 7.

The two forms apparently occur together.

Cape Province: Kologha, 4 ♂♂, 2 ♀♀, viii.1931.

Bred from seeds of *Fagara* sp.

A. penicillatum var. **basipenne**, n.

Resembling var. *leptorrhinum* in the form of the rostrum in ♂, but differing in having a large triangular patch of dense fulvous setae at the base of the elytra, the base of the patch extending across the shoulders and its apex reaching the sutural tuft.

Natal: Malvern, 1 ♂, 1902 (*C. N. Barker*). Pondoland: Port St. John, 2 ♂♂, x.–xi.1923 (*R. E. Turner*—type). Cape Province: Kologha, 1 ♂, viii.1931.

Subfamily Anthonominae.

Genus **Apopnictus**, nov.

Head deeply strangulated immediately behind the eyes, the posterior portion globular and sunk in the prothorax, the forehead as broad as the base of the rostrum; eyes abruptly truncate behind, so that the posterior margin (as seen from above) forms an angular projection, the longitudinal outline of the eye being only slightly convex. *Rostrum* deflected; scrobes passing immediately beneath the rostrum, separated at the base only by a narrow carina; mandibles bidentate, decussate. *Antennae* with the scape clavate and reaching the eye; funicle with joint 1 stout and longer than broad, 2 only slightly longer than 3,

3–6 subequal and transverse, 6 fitting closely to the club, which is narrowly ovate and acuminate. *Prothorax* subconical, bisinuate at the base, the apical margin sinuate dorsally and beneath. *Scutellum* elevated, sharply conical. *Elytra* concealing the pygidium, setose, without scaling, with ten punctate striae. *Wings* functional. *Legs* with the femora clavate and all bearing a small tooth; tibiae simple and with a very small mucro; tarsi hardly as long as the tibiae, joint 3 deeply bilobate and spongy beneath, 4 elongate, the claws with a long tooth.

Genotype: *Apopnictus zizyphi*, sp. n.

Most nearly allied to *Phacellopterus*, Schh. 1847, which differs *inter alia* in its non-strangulate head and unarmed femora. The conical scutellum is a very unusual character.

Apopnictus zizyphi, sp. n. (Fig. 3.)

♂♀. Colour piceous black, thinly clothed with subrecumbent whitish setae.

Head (fig. 3, *a*) with coarse shallow punctures and curved setae; the forehead higher

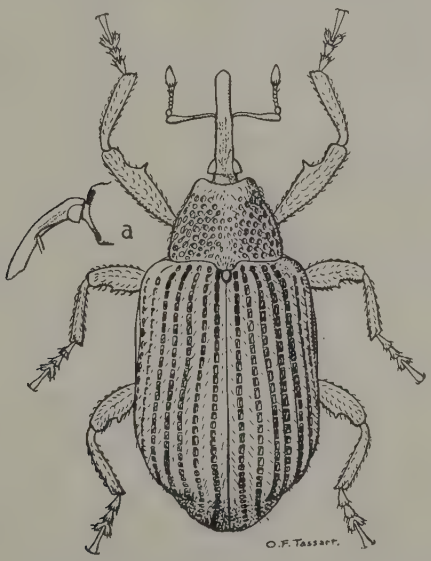


Fig. 3.—*Apopnictus zizyphi*, sp. n.; *a*, side view of head.

than the eyes, strongly convex longitudinally and bearing a median carina. *Rostrum* of ♂ stout, as long as the head and pronotum, gently curved, subcylindrical, opaque, rugosely punctate and with sparse subrecumbent setae throughout, with a low median carina in the basal half and a lateral one in front of the eye; of ♀, longer and markedly narrowed in the apical half, which is much more finely sculptured but opaque. *Antennae* inserted at about the middle of the rostrum in ♂ and behind it in ♀, piceous, with the scape more or less reddish. *Prothorax* a little broader than long, widest at the base, with the sides straight, narrowing to two-thirds and thence rather strongly constricted to the apex; the dorsum with coarse subreticulate punctures and usually a low median carina in the posterior two-thirds, which is often concealed by a narrow stripe of scale-like setae. *Elytra* oblong-ovate, much broader at the roundly rectangular shoulders than the base of the prothorax

(1 : 0·7), parallel-sided thence to beyond the middle, rather broadly rounded at the apex, with a shallow transverse impression on the disk at about one-fourth from the base and an ante-apical depression, but without any definite callus on the declivity; the striae broad and deep, with large close deep punctures, the septa being lower than the intervals, which are broader than the striae, flat and finely rugulose, each bearing a row of subrecumbent pale setae, which are often duplicated for a short distance behind the middle on ints. 2, 3, 5; int. 1 lower than the others at the base; the setae not longer than a single puncture in the striae. *Legs* rugosely punctate, set with coarse subrecumbent whitish setae; the femoral tooth sharp, perpendicular, but smaller on the hind pair.

Length, 3·1–3·4 mm.; breadth, 1·5–1·6 mm.

Transvaal: Pretoria, on *Zizyphus zeyheriana*, 6 ♂♂, 4 ♀♀, vi.1931 (*H. K. Munro*).

Apopnictus longisetis, sp. n.

Closely allied to the genotype but smaller and of a red-brown colour, and differing also in the following characters:

Rostrum more finely sculptured, without carinae; that of ♀ not narrowed apically, cylindrical, evenly punctate throughout, the punctures being longitudinally confluent. *Elytra* with the punctures in the striae more rounded and the septa between them on a level with the intervals; the setae much longer and more conspicuous, being nearly as long as two punctures.

Length, 2·3–2·4 mm.; breadth, 1·1 mm.

Orange Free State: Bothaville, 1 ♂, 1 ♀ (*Dr. H. Brauns*).

SOME NEW SPECIES OF *CHELONELLA* (HYM. BRAC.)

By D. S. Wilkinson

(*Entomologist, Imperial Institute of Entomology.*)

Chelonella cereris, sp. n.

♂♀. Black; the scape, trochanters and trochantines sometimes, apices of the anterior femora, the front tibiae, the middle tibiae to some extent, red to red testaceous; all tarsi darkened; tibial spurs, and a band across the carapace basally, white; wings more or less hyaline in basal half, weakly infumated in apical half; stigma and wing-veins dark red-brown; the pale band towards the base of the carapace occupies about one-fifth of the length of the carapace, is more or less circular, medianly commencing at about the apex of the basal fifth, laterally, however, commencing at the base of the carapace; the band is rather broader laterally, with the result that the apical margin of the band is very decidedly bisinuate; the basal area of the carapace enclosed by the band more or less semicircular, the diameter of the semicircle coinciding with the base of the abdomen.

Head transverse and with very well-marked striation, the striae longitudinal on the facial and frontal orbits, transverse on the occiput; the posterior ocelli nearer to each other than to the eyes, situated on or slightly anteriorly to an imaginary straight line joining the extreme posterior margins of the eyes; flagellum of ♂ with 18–20 joints, usually 20. *Abdomen*: caparace in both ♀ and ♂ with length roughly 2·8 times the greatest depth (fig. 1, *a*); the foramen in the apex of the ♂ carapace (fig. 2, *c*) very broad, about 16 times as broad as long (5 : 80) (length = perpendicular height on apex of carapace), extended round on to the sides of the carapace to almost halfway between the apex of the carapace and the apex of the pale basal coloration.

Length, 3 mm.

South Africa: Ceres, Cape Province, 3 ♀♀, 7 ♂♂, iv.1925, 1 ♂, ii.1921 (*R. E. Turner*).

Type in the British Museum.

Host unknown.

On account of the shape of the foramen in the ♂ carapace, this species is closely related to *malayana*, sp. n.: they are easily separable, however, as in *cereris* the carapace is noticeably deeper and the foramen noticeably broader.

The specimens from which this species has here been described were confused in the British Museum collections amongst *curvimaculata*, Cam.; and the description of the shape of the foramen in the ♂ carapace of *curvimaculata* in my paper on the Braconid parasites of *Platyedra* (1928, *Bull. Ent. Res.*, **18**: 391) is in fact a description of the foramen in *cereris*, as may be seen from the accompanying figures. Cf. notes under *Chelonella versatilis*, in the present paper.

Chelonella malayana, sp. n.

♂♀. Black; scape largely, mouth-parts, anterior femora at apex, the front tibiae and tarsi largely, more or less red testaceous; the basal two-fifths of the carapace, and the apical three-fifths of the basal half of the hind tibiae, pale to white, as are the hind tibial spurs; the middle tibiae and tarsi marked as the hind tibiae and tarsi, only much more weakly so; wings infumated, the stigma and wing-veins red-brown; the carapace darkened in a small semicircular area at extreme base.

Head transverse and with fine rugosity; the posterior ocelli distinctly nearer to each other than to the eyes, situated anteriorly to an imaginary straight line joining the extreme posterior margins of the eyes; flagellum of ♂ with 22 joints. *Abdomen*: carapace of the ♀ with length roughly 3·7, and of the ♂ four, times the greatest depth (fig. 1, *b*); the foramen in the apex of the ♂ carapace (fig 2, *d*) very broad, about 25 times as broad as long (2 : 50) (length = perpendicular height on apex of carapace), but only just extended on to the sides of the carapace.

Length, 3 mm.

Federated Malay States: Kuala Lumpur, 3 ♀♀, 2 ♂♂, 22.iii.1923, 1 ♂, 11.iii.1927, Batu Gajah, Perak, 3 ♀♀, 1 ♂, 18.iv.1927 (*H. M. Pendlebury*).

Type deposited in the British Museum.

Host. The specimens from Kuala Lumpur are labelled "from bamboo hedge."

This species is closely related to *cereris*, sp. n.

Chelonella socors, sp. n.

♂♀. Black; legs (except the coxae) dark red testaceous to red-brown, the tarsi, hind femora, basal fourth and apical half of the hind tibiae, more strongly darkened; tibial spurs pale; stigma and wing-veins red-brown, the wings decidedly infumated.

Head transverse and finely striate, the striae longitudinal on the facial and frontal orbits, transverse on the occiput; the posterior ocelli nearer to each other than to the eyes, situated on an imaginary straight line joining the extreme posterior margins of the eyes; flagellum of ♂ with 19–20 joints. *Abdomen*: carapace of the ♀ with length roughly 3·3, and of the ♂ 3·1, times the greatest depth; the foramen in the apex of the ♂ carapace (fig. 2, *e*) virtually oval, its breadth twice its length (length = perpendicular height on apex of carapace).

Length, 3 mm.

South Africa: Mossel Bay, Cape Province, 5 ♂♂, xii.1921, 1 ♀, 18–30.xi.1921 (*R. E. Turner*).

Type in the British Museum.

Host unknown.

Chelonella bedfordi, sp. n.

♂♀. Black; scape, about basal half of antennae, apices of the anterior femora, the front tibiae and tarsi entirely, middle tibiae more or less, extreme base of the hind tibiae, red testaceous; apical half of the flagellum, and the remainder of the front femora, red-brown; middle tarsi very pale; hind tarsi, the posterior tibial spurs, and a band across the carapace basally, white; the apical joint of all tarsi darkened; wings hyaline, the stigma dark red-brown, and but few of the wing-veins strongly pigmented; the pale band on the carapace in its lateral fourths occupies the entire basal fourth of the carapace, in about its median two-thirds to one-half, however, occupying only about the apical half of the basal fourth of the carapace, the carapace basally being black in a semicircle the diameter of which coincides with the base of the abdomen.

Head strongly transverse and with rugose striation; the posterior ocelli about equidistant from each other and the eyes or rather nearer to the eyes, situated anteriorly to an imaginary straight line joining the extreme posterior margins of the eyes; flagellum of ♂ with 17 joints. *Abdomen*: carapace of the ♀ with length roughly 2·5, and of the ♂ three, times the

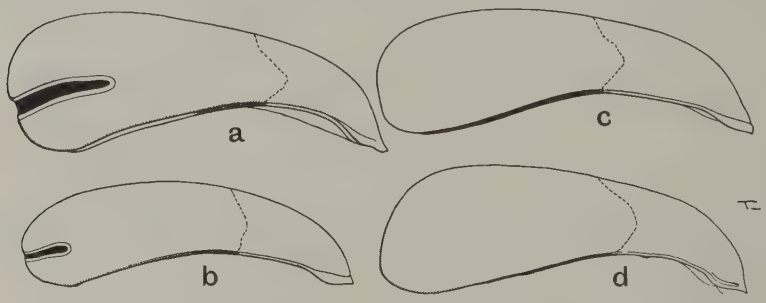


Fig. 1.—Lateral view of carapace of: (*a*) *Chelonella cereris*, sp. n., ♂; (*b*) *C. malayana*, sp. n., ♂; (*c*) *C. curvimaculata*, Cam., ♀; (*d*) *C. versatilis*, sp. n., ♀.

greatest depth; the foramen in the apex of the ♂ carapace (fig. 2, *f*) virtually oval, its breadth 1·5 times its length (length = perpendicular height on apex of carapace).

Length, 2·75 mm.

Anglo-Egyptian Sudan: Singa, 4 ♀♀, 3 ♂♂, 7.iv.1929 (*H. W. Bedford*). Type deposited in the British Museum.

Host. Some of the specimens are labelled "bred from Lepidopterous larva feeding on gall *Acacia seyal*," and the others "bred from gall on talh."

Chelonella versatilis, sp. n.

♂♀. Black; scape, all trochanters and trochantines, the anterior femora, apical half of the anterior tibiae, the hind femora at base, and the front tarsi, red testaceous to red; the basal half of the anterior tibiae pale; tibial spurs, majority of the basal joint of the posterior tarsi, the basal half of the hind tibiae (except at extreme base which is black), and the basal two-fifths of the carapace, pale to white; remainder of the posterior tarsi more or less darkened; wings hyaline, the stigma and wing-veins dark brown; the carapace in a semicircular area at extreme base occasionally darkened to a varying degree.

Head transverse, striate; posterior ocelli about equidistant from each other and the eyes in the ♂, rather nearer to each other in the ♀, situated anteriorly to an imaginary straight line joining the extreme posterior margins of the eyes. *Abdomen*: carapace of the ♀

with length roughly 3·5, and of the ♂ three, times the greatest depth (fig. 1, *d*); the foramen in the apex of the ♂ carapace (fig. 2, *a*) with breadth nearly five times its length (length = perpendicular height on apex of carapace).

Length, 3·0–3·5 mm.

Anglo-Egyptian Sudan: Tokat, 1 ♂ (*type*), 18.xii.1927 (*J. W. Cowland*); Shambat, 1 ♂, 26.ix.1926 (*H. W. Bedford*); Kenyo, 2 ♀♀, 16.iii. 1928 (*H. W. Bedford*).

Type deposited in the British Museum.

Host. The male from Tokat is labelled "parasite of *Heliothis obsoleta*," the other male "on cotton," while the two females are labelled "from Pink Bollworm."

This species was originally determined by me for the Sudan Government as *curvimaculata*, Cam., under which name notes on its biology have, I believe, been published.

This new species is easily separable from *curvimaculata* on the shape of the foramen in the ♂ carapace, as shown in figures (fig. 2, *a* & *b*). In this con-

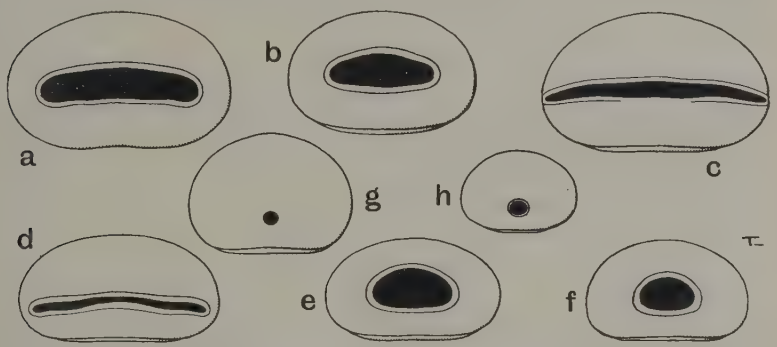


Fig. 2.—The foramen in the apex of the male carapace of: (*a*) *Chelonella versatilis*, sp. n.; (*b*) *C. curvimaculata*, Cam.; (*c*) *C. cereris*, sp. n.; (*d*) *C. malayana* sp. n.; (*e*) *C. socors*, sp. n.; (*f*) *C. bedfordi*, sp. n.; (*g*) *C. ritchiei*, Wilkn.; (*h*) *C. robertiana*, Cam.

nection it should be noted that the description of the foramen in *curvimaculata* as given by myself in 1928 (*Bull. Ent. Res.*, **18**: 393) is entirely incorrect: cf. notes under *Chelonella cereris*, sp. n., in the present paper.

Chelonella curvimaculata, Cameron 1906.

This species is known to me from the type, and from 18 ♀♀, 7 ♂♂, which latter were taken in various localities in South Africa (*R. E. Turner*). I also have before me 7 ♂♂, Reduit, Mauritius, xi.1928 (*W. H. Edwards*), which agree perfectly with *curvimaculata* except that they have the coloration on the base of the carapace considerably reduced; but this is a colour character that I consider to be unstable.

Host. The series from Mauritius was bred from *Phthorimaea* on potato and tobacco. Cf. notes under *cereris* and *versatilis* in the present paper.

The African species represented in the British Museum, and which for certainty may be referred to *Chelonella* rather than to *Chelonus*, are separable by means of the following key, in which have been included all those described

above together with one or two Palaearctic species and also the new Indo-Australian species whose description is also given in this paper :

1. Foramen in apex of carapace of ♂ very broad (breadth = transverse width across apex of carapace), many times broader than its length (length = perpendicular height on apex of carapace) . . . . . 2.
   Foramen not so describable . . . . . 3.
2. Carapace in both sexes very noticeably deeper at apex than basally, with the foramen in that of the ♂ extended round sides almost to halfway between apex of carapace and apex of pale basal coloration (fig. 1, *a*) (S. Africa) . . . . . *cereris*, sp. n.
   Carapace in both sexes flat, hardly deeper at apex than basally, with the foramen in that of the ♂ only just extended on to sides (fig. 1, *b*) (Federated Malay States) . . . . . *malayana*, sp. n.
3. Carapace entirely black . . . . . 4.
   Carapace with light marking basally . . . . . 7.
4. Head cubical, posterior ocelli posterior to an imaginary straight line across head joining extreme posterior margins of eyes (England) . (*exilis*, Marsh.).
   Head transverse, posterior ocelli in line with or anterior to posterior margins of eyes . . . . . 5.
5. Foramen in apex of carapace of ♂ small, almost round (fig. 2, *h*) (S. Africa) *robertiana*, Cam.
   Foramen large, occupying a large area on apex of carapace . . . . . 6.
6. Carapace distinctly produced below middle of foramen; hind femora of ♀ clear red testaceous, of ♂ black (England) . . . (*latrunculus*, Marsh.).
   Carapace not produced below middle of foramen; hind femora in both sexes dark red-brown (S. Africa) . . . . . *socors*, sp. n.
7. Foramen in apex of carapace of ♂ very small (fig. 2, *g*); majority of the four anterior coxae and of hind femora red testaceous (Uganda) *ritchiei*, Wilkn.
   Foramen large, oval; anterior coxae and hind femora black, or at least very dark red-black . . . . . 8.
8. Foramen in apex of carapace of ♂ not twice as broad as long (fig. 2, *f*); 1st abscissa of radial straight (Sudan) . . . . . *bedfordi*, sp. n.
   Foramen with breadth more than three times greatest length; 1st abscissa of radial slightly sinuate . . . . . 9.
9. Foramen in apex of carapace of ♂ with breadth about three and a half times length (36 : 10) (fig. 2, *b*); apex of female carapace perpendicular (fig. 1, *c*); middle femora largely black (S. Africa) . . . . *curvimaculata*, Cam.
   Foramen with breadth nearly five times length (48 : 10) (fig. 2, *a*); apex of female carapace not perpendicular (fig. 1, *d*); middle femora entirely red testaceous (Sudan) . . . . . *versatilis*, sp. n.

Note.—The coloration on the base of the carapace is clearly an unstable character, but to what extent and in what species remains to be shown by long series of bred specimens.

A NEW SPECIES OF THE GENUS *ZAPRIONUS*, COQ. (DIPTERA, DROSOPHILIDAE)

By John R. Malloch, Washington, D.C.

The genus *Zaprionus*, Coquillett, was erected for the reception of an African species, *vittiger*, Coquillett, and that is until now the only species correctly placed in the genus. Amongst some material recently received from Mr.

Alex. Cuthbertson of the Department of Agriculture of Southern Rhodesia, there is one specimen of a new species and a few specimens of the genotype. The two species are very similar in general colour and size, but may be distinguished as in the following synopsis :—

A. Fore femur with four to six bristles on the apical half of the postero-ventral surface which are situated on slightly raised bases and have each a short sharp-pointed rectangularly directed spine at base on the inner side (fig. 1); frons with a white line along each lateral margin and without a central white line . . . . . *vittiger*, Coquillett.

AA. Fore femur with a short stout process on postero-ventral surface just beyond middle which has some short bristles on it, and basad of the process some black bristles on the same surface (fig. 2); frons with a white line along each side and an additional narrower white line along centre . . . . . *tuberculatus*, sp. n.

Fig. 1.—Fore femur of *Zaprionus vittiger* from behind, and below one bristle with basal spur more enlarged.

Fig. 2.—Fore femur of *Zaprionus tuberculatus* from behind.

Zaprionus tuberculatus, sp. n.

♀. General colour reddish-testaceous, the mesonotum darkest. Frons orange yellow, with a central white line and a broader line along each lateral margin, the latter edged with black on most of their extent; ocellar triangle dark brown; antennae and palpi not blackened. Mesonotum with two narrow white lines in continuation of the two on the frons which are carried over the sides of the scutellum and are edged with black, more distinctly on the mesial edge, and a rather narrower white line on each notopleural margin which is continued over the humeral calli; pleura without a well-defined white vitta as in *vittiger*. Abdomen without the small black spots at the apices of the tergites as in *vittiger*. Wings yellowish-hyaline. Halteres yellow.

Structurally similar to the genotype, the principal distinction being in the form and armature of the fore femora as shown in the accompanying figures.

Length, 2·5 mm.

Type, S. Rhodesia, Umtali, Sept. 27 (*A. Cuthbertson*). One specimen.

There is no indication on the label of the habits of the species, but like its congener, it will no doubt be found to feed on fruits, more especially those that have fallen.

The type specimen will be deposited in the British Museum.

NEW AND RARE SYRIAN BUTTERFLIES (LEPIDOPTERA, LYCAENIDAE)

By Captain A. F. Hemming, C.B.E.

Plate I.

When last in this country, Mr. R. E. Ellison was good enough to place at my disposal for examination an interesting collection of butterflies which he had been able, during the last three years, to make in the Lebanon. This collection contained a new species of Lycaenid and also includes a striking new subspecies of *Aricia chiron*, Rott. 1775 [= *eumedon*, Esp.], a species not previously recorded from the Lebanon. Mr. Ellison asked me to describe these; and I now accordingly give the following description of the latter. Of the former, Herr Ernst Pfeiffer of Munich has recently published a description under the name *Lycaena ellisoni*. I take this opportunity, however, of illustrating both sexes of this interesting species and of figuring the male genitalia. As will be seen from the short description which I add in supplement to that given by Herr Pfeiffer, the genitalia are, in this case, of special importance in determining the real systematic position of this species.

Aricia chiron mylitta, subsp. n.

(Pl. I, figs. 7, 8 ♂.)

Differs from *A. chiron chiron*, Rott., as follows :—

♂ *Upperside.* Ground-colour dark greyish-brown (very dark blackish-brown in *c. chiron*); *fore-wings* discoidal spot, slightly darker brown than and therefore shows up slightly against the ground-colour (practically invisible in *c. chiron*); *hind-wings* with a series of 3 oval submarginal blackish spots in Interspaces 1b, 2 & 3 faintly outlined with paler brown scales (absent or completely lost in ground-colour in *c. chiron*). The spot in Interspace 2 is surmounted by a few yellowish scales (hardly visible to the naked eye). *Underside.* Ground-colour palish grey (brown or greyish-brown in *c. chiron*); metallic green scaling present at base of discoidal cell of fore-wings (absent in *c. chiron*) and on hind-wings extends over the basal third of the wing up to the discoidal spot and beyond in Interspaces 1b & 2 (confined in *c. chiron* to the base of the wing and not usually extending more than halfway towards the discoidal spot); *fore-wings*, black antimarginal spots and chevrons, though inconspicuous distinctly more prominent than in *c. chiron*; black discoidal spot rounder and relatively larger than in *c. chiron*; *hind-wings* discal series of black spots smaller than in *c. chiron* and surrounded by flatter (*i.e.* less arched) black chevrons.

♀ *Upperside.* Ground-colour slightly paler shade of greyish-brown than in the ♂ and therefore even more different from the dark blackish-brown ground-colour of *c. chiron*; *fore-wings* dark brown discoidal spot stands out prominently against ground-colour owing to presence of whitish scaling by which it is surrounded; *hind-wings* with a series of 3 oval blackish submarginal spots in Interspaces 1b, 2 & 3, edged externally with whitish scales and surmounted internally by faintly indicated pale yellowish-orange semilunar chevrons. *Underside.* Generally similar to that of ♂ except that discal series of black spots on the hind-wings are larger (though much smaller than in *c. chiron*).

Average length of fore-wing, ♂ 12 mm.; ♀ 13 mm. (in *c. chiron,* ♂ 15 mm.; ♀ 16 mm.).

Habitat. Lebanon, Cedar Mountains, about 9500 ft.

♂ Holotype " Lebanon, Cedar Mountains, 9500 ft., 2.8.1930 (*R. E. Ellison*)." (B.M. Type No. Rh. 378), and ♀ allotype, same data as ♂ holotype, in Ellison Coll.

Paratypes ♂ 5, ♀ 1 (same data as holotype) in Ellison Coll. and ♀ 1 (same data) in Hemming Coll. (*A. F. Hemming* Coll. No. 32026).

In 1931, Mr. Ellison found this species fairly plentiful and obtained about 30 specimens.

Major Graves obtained one specimen on the Cedar Mountains at an elevation of about 10,000 ft. at the end of August 1910. This was taken on the same ground as that on which he found *A. ellisoni*, Pfeiff.

This subspecies may be readily separated from other subspecies of *A. chiron* by the greyish-brown of the upperside and on the underside by the great extension of the metallic-green scaling and the greyish (instead of brownish) tone of the ground-colour.

Albulina ellisoni (Pfeiffer).

(Pl. I, figs. 1, 2 ♂, 3, 4 ♀, 5, 6 ♂ genitalia).

Lycaena ellisoni, Pfeiffer, 1931, Mitt. München. ent. Ges., **21** : 65.

The male *genital armature* (Pl. I, figs. 5 & 6) are of the highly characteristic Plebeid type. The dorsal part consists of two lateral apophyses (more tapering and less massive in *Albulina* than in other Plebeid genera) connected by a relatively featureless strip of chitin. To each of these apophyses is attached at the base a movable process which in this species is unusually short and, at its terminal part, much thinner than in allied species; the clasp is of the usual fusiform shape found in the Plebeids. Viewed in profile, it is characterised in this species by the greater development, on its upper edge, of the shoulder seen at a point about two-thirds of its length from the base of the clasp; the terminal portion of the clasp is noticeable for the long and tapering shape of the spiracular branch; the extreme end of this process (fig. 6) bears a series of minute saw-like teeth. These teeth are continued along the inner face of the spiracular branch for about one-quarter of its length.

It will be seen from the foregoing description that *A. ellisoni* is not closely related to the species of the genus *Glaucopsyche* Scudder (1872), notwithstanding its superficial resemblance to some species of that genus and, in particular, to *G. coelestina*, Ev. (1843). The type of the genitalia in *Glaucopsyche* may be seen by reference to the figure published by Wheeler (1913–1914 in Tutt, *Brit. Butt.*, **4**, pl. 31, fig. 1). The genitalia of *A. ellisoni* demonstrate its close relationship to the high mountain species of the genus *Albulina*, Tutt 1909 (type *pheretes*, Hb. = the true *orbitulus* of de Prunner), and, in particular, to the Himalayan species of that genus *A. metallica*, Feld. (1865), and *A. galathea*, Blanch. (1844).

This species was originally discovered by Major P. P. Graves, who took a worn ♂ and a ♀ in good condition on the Cedar Mountains, at the end of August, 1910. These specimens were taken at a point about three miles to the north-east of the Cedars at an elevation of about 10,000 ft. The species was not again recorded until Mr. Ellison took 8 males on 22nd and 23rd June, 1930 at the Cedars, above Bsherreh at the much lower elevation of 6315 ft. In 1931, Mr. Ellison took a long series of males and over 20 females. No females had emerged at the time of his visit in 1930. All the females taken this year were found at an elevation of about 9000 ft. In the same year also, the species was taken at Bsherreh by Herr Pfeiffer, by whom it was named, and by Herr Schwingenschuss. The first males were taken on June 20th, and by the end of the month these were not uncommon. The last-named collector also later took the species elsewhere on the Cedar Mountains at elevations between 7000 ft.

and 8000 ft. Major Graves' specimens were, as already stated, taken in August at 10,000 ft. From the material now available it may be assumed that like other mountain species, *A. ellisoni* has a graduated emergence and that it appears first at the lowest localities in which it occurs and gradually as the season advances emerges at its higher stations. The specimens taken by Major Graves were flying on a Vetch which he was informed was *Vicia hirsuta*.

For the photographs which accompany this paper I am indebted to my friend Mr. W. H. T. Tams and for the *camera lucida* drawings of the genitalia of *A. ellisoni* to my wife.

Explanation of Plate I.

Figs. 1, 2. *Albulina ellisoni*, Pfeiffer. ♂. Lebanon, Cedar Mountains, near the Cedars, 6315 ft. 23.6.1930, *R. E. Ellison*.
3, 4. *Albulina ellisoni*, Pfeiffer. ♀. Lebanon, Cedar Mountains, 10,000 ft., late August 1910, *P. P. Graves*.
5. *Albulina ellisoni*, Pfeiffer. ♂ genital armature, ventral view.
6. *Albulina ellisoni*, Pfeiffer. Terminal portion of ♂ clasp (on larger scale).
7, 8. *Aricia chiron mylitta*, Hem. ♂ holotype.

Note.—All the specimens figured are now in the British Museum (Natural History).

A DESCRIPTION OF *TOMASPIS BODKINI*, WILLIAMS (HOMOPTERA, CERCOPIDAE), FROM BRITISH GUIANA

By Alan Pickles, B.Sc., A.I.C.T.A., F.E.S.

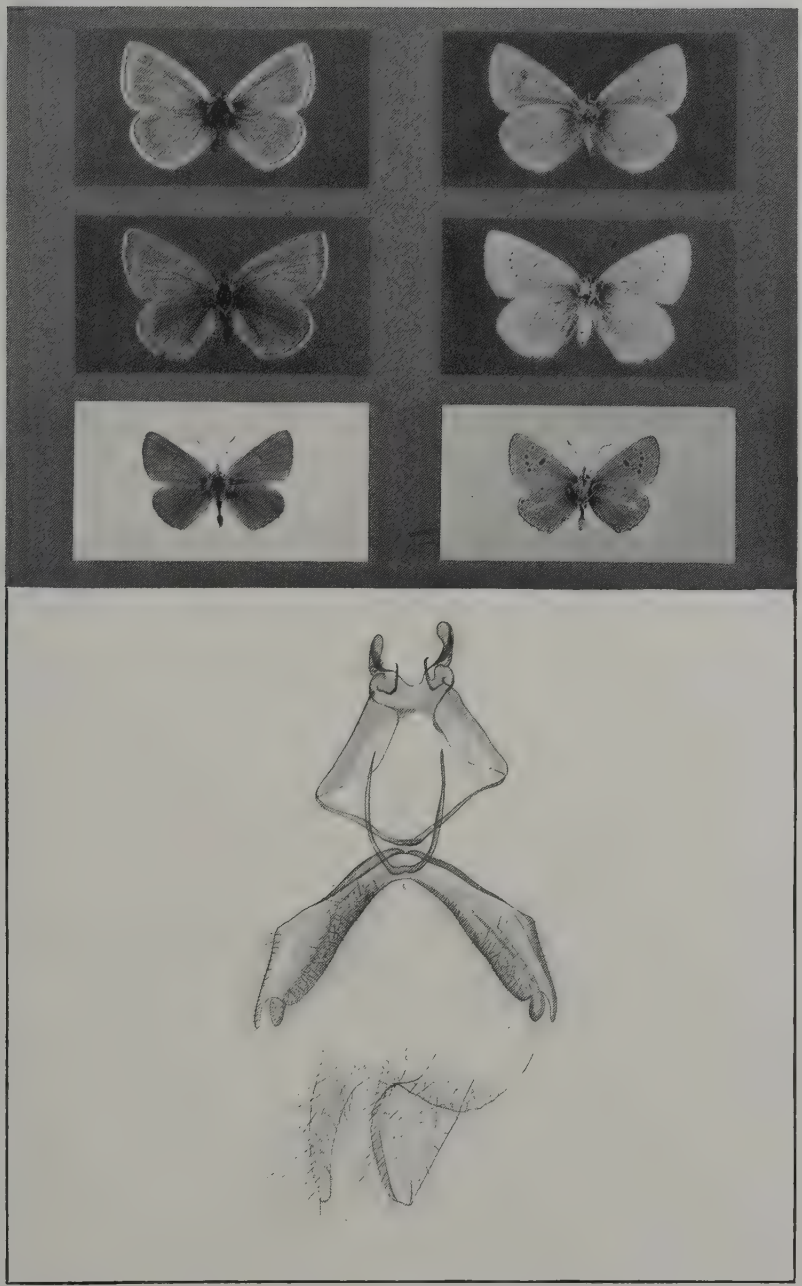
(*Entomologist, Trinidad Sugar-Cane Investigation Committee*).

In 1916, Mr. C. B. Williams, then Entomologist in charge of Froghopper Investigations, visited British Guiana in search of a froghopper parasite which might be suitable for introduction into Trinidad. His report (1) mentions that in that country, he investigated chiefly two species of *Tomaspis*, namely, *T. flavilatera*, Urich, and a species undescribed, which was found abundantly on grass in the rubber plantations at Hosororo (Issororo) in the North-West District. A coloured figure of this second species appears in the report, under the name *Tomaspis bodkini*, and, although no description has ever been published (2), this is taken to be an "indication" within the meaning of Article 25 of the International Rules of Zoological Nomenclature.

This froghopper was encountered again in February 1913 at Wauna, North-West District, British Guiana, by Dr. J. G. Myers, and from the series collected by him, I have been enabled to formulate the description which follows.

Tomaspis bodkini, Williams.

Head, pronotum and scutellum black, pubescent; pronotum and scutellum occasionally flushed with reddish; eyes black, ocelli amethyst; frons with a single median longitudinal carina, black. *Legs* with the coxae and trochanters yellow or reddish-yellow, otherwise reddish-brown to black. *Tegmina* dark brown, somewhat paler towards the apices, divided into thirds by two transverse, light orange bands, these rather wider at the anterior wing-margin, narrow elsewhere; interior basal margin with a darker orange band, those of the



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New and Rare Syrian Butterflies.

two tegmina forming a V-shaped mark bounding the posterior margins of the pronotum and of the scutellum. *Abdominal segments* dark red-brown, narrowly margined with red.

Male Genitalia (fig. 1). Aedeagus expanded basally for rather more than half its length; two spines proceed from the anterior side of the distal limit of this expansion (fig. 1, *b*). Parameres (fig. 1, *c* and *d*) with a distinct hook about the middle of the length. Subgenital plates somewhat longer internally than externally, with an obtuse prolongation of the inner terminal corner (fig. 1, *e*).

Length, 7 mm.

Described from nine males and three females.

Plesiotype in author's collection; plesio-paratypes in collection of author, of Dr. J. G. Myers and in the British Museum.

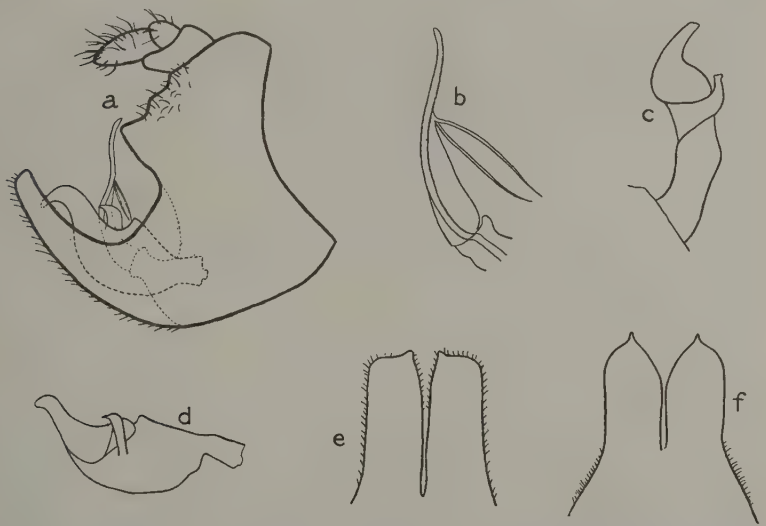

FIG. 1.—*Tomaspis bodkini*, Williams. *a*, Lateral view of male genitalia; *b*, aedeagus, from the side; *c*, right paramere, dorsal aspect; *d*, right paramere, inner aspect; *e*, genital plates, from beneath. *f*, *Tomaspis saccharina*, Dist. Genital plates, from beneath.

This species bears a superficial resemblance to *Tomaspis saccharina*, Dist., which also has male genitalia of a very similar type. *T. saccharina*, however, may be distinguished from the preceding by the transverse bands of the tegmina, which are pale yellow instead of orange, and by the subgenital plates of the male, which are acutely produced near the middle of the posterior end (fig. 1, *f*).

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SOME NYCTERIBIIDAE FROM THE AUSTRALIAN REGION PART I: SPECIES FROM THE NEW HEBRIDES

By Hugh Scott, Sc.D., F.L.S., F.E.S.

This and the following paper include descriptions of two species of bat-parasites new to science and a record of a third species from the New Hebrides, an archipelago whence no Nycteribiid had previously been made known; a description of a new species from Fiji; and remarks supplementing earlier descriptions or bearing on the synonymy and geographical distribution of several other species from the Papuan region, New Caledonia and Australia. These last are mainly species of *Cyclopodia*, and it is not attempted to give an account of the entire Nycteribiid fauna of the countries under review, except in the case of the New Hebrides.

I have examined material from the New Hebrides collected in the islands of Espiritu Santo and Tanna in 1925 by Dr. P. A. Buxton, in Espiritu Santo in 1927 by Dr. J. R. Baker, and in Malekula in 1929 by Miss L. E. Cheesman. Three species are represented, namely, (i) *Penicillidia buxtoni*, sp. n., allied to *P. oceanica* (Bigot), a form occurring in New Caledonia and Queensland, the host of both these species being *Miniopterus australis*; (ii) *Nycteribia* (*Listropodia*) *bakeri*, sp. n. (also from *Miniopterus australis*), intermediate between two species, one of which is known from the Moluccas, Amboina and parts of Australia, and the other from New Caledonia, the Loyalty Is. and Queensland; and (iii) *Cyclopodia oxycephala* (Bigot), previously known from New Caledonia and the Loyalty Is., now recorded for the first time from the New Hebrides.

The new species from Fiji, *Cyclopodia pembertoni*, is allied to *C. oxycephala*, the distribution of which has just been mentioned, and to *C. minor*, Speiser, which is known only from New Britain. As to the other species discussed, *Penicillidia oceanica* was previously known only from New Caledonia, but is now recorded from Queensland. The identity of *Nycteribia pteropus*, Rainbow (1904), with *Cyclopodia albertisi*, Rondani (1878), is established, and New Guinea, Salwati and the Kei Is. are added to the known range of this species, previously recorded from the Moluccas and parts of Australia. *C. similis*, Speiser, is very close to *C. albertisi*, but its distinguishing features are given after examination of part of the original type-material, and the Timorlaut Is. are added to its range. The original description of *Cyclopodia minor*, Speiser, is supplemented. I am indebted to the Museums of Berlin and Genoa for the loan or exchange of material which has helped to elucidate the relationships of this confusing group of species of *Cyclopodia*. Several of the new records are based on material sent me many years ago by the late Dr. Frederick Muir, others on specimens more recently received from various sources by the British Museum.

The eight species reviewed in these two papers are all, so far as known, confined to the Australian zoogeographical region, but, if Australia proper, the Austro-Malayan (Papuan) and the Polynesian be accepted as subdivisions of that region, most of the species occur in more than one subdivision. The Australian region as a whole seems relatively rich in species of these parasites, though it is difficult to estimate how it will eventually compare with the Oriental and Ethiopian regions.*

* Musgrave (1925, *Rec. Austr. Mus.*, **14**: 289–300, and 1927, **15**: 263–276) has enumerated seven species recorded only from Australia proper; eight species are reviewed

Returning to the critical study of NYCTERIBIIDAE after an interval of about five years, I am more than ever impressed by their bizarre forms and structural modifications, which place them among the most remarkable of all insects. The varying degrees of reduction of segmentation in the abdomen of the female, the extraordinary shapes assumed in some cases by the chitinous sclerites, and the variety of combinations of these shapes presented by different species, are indeed striking. There are also groups of species in which successive gradations in the development or reduction of particular characters can be clearly traced. Instances of these phenomena are mentioned in the present paper under the heading " Affinities " in *Penicillidia buxtoni* and, in the following paper, in the remarks on *Cyclopodia similis*. Individual variation is discussed in the following paper under *Cyclopodia albertisi*.

The *types* of the new species are in the British Museum.

The material examined is all preserved in alcohol, and the drawings have all been made from specimens lying in alcohol, with the help of a drawing-apparatus. Figure 1 is from a drawing made some years ago in Cambridge by Mr. H. Gillings, the remainder are from detailed pencil-drawings by myself, inked over and in part completed by Miss O. F. Tassart. I am much indebted to these two helpers for their care.

PENICILLIDIA, Kolenati.

Penicillidia buxtoni, sp. n.

Resembles *P. oceanica*, Bigot, in several respects, notably in the extreme reduction of the abdominal ctenidium, but differs from that species by its larger size, also (in the ♂) by the form of the claspers, and, in the ♀, by the completely different arrangement of the abdominal segmentation, especially on the dorsal surface.

Length (front of thoracic sternal plate to end of abdomen) *ca.* 2·5 mm. *Head* not laterally compressed, bare at the back and sides, but with the vertex bearing moderately long bristles, behind which are short bristles, extending further back than in *P. oceanica*. Eyes, a single minute ocellus on either side, just below the bristly area, absolutely the same colour as the surrounding chitin, and only visible when the head is viewed in profile under a high power. *Thorax* with the ventral plate appearing about 1¼ (in the ♂), nearly 1½ (in the ♀), times as broad as long, convex from front to hind margin; median longitudinal suture impressed and dark-coloured, curved transverse sutures inconspicuous, surface covered with very fine short bristles, hind margin with about eight bristles on either side of the middle, of lengths varying from very short to moderate. Dorsally, the lateral ctenidia appear normal, but are largely hidden (when viewed from above) by a fold of the whitish connexivum (as in *P. oceanica* and other species of this genus), only the distal part of the front six or seven teeth being visible; there is an oblique transverse series of about seven rather long bristles on the chitinous part of the thorax, on either side, just in front of the halter and level with the front of the hind coxa. *Legs* rather long and slender, the pseudo-articulation near the base of the femur, and the bristling,

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in the present paper and its sequel, and eight others have been recorded from various parts of the region, so that twenty-three is the total so far known for the Australian region. For comparison it may be noted that I enumerated seventeen species from India, Ceylon and Burma (1925, *Rec. Ind. Mus.*, **27**: 351–384). Professor G. F. Ferris recently expressed verbally the view that the Austro- and Indo-Malayan faunistic areas are the part of the world richest in NYCTERIBIIDAE, possibly their centre of distribution, and that the poverty of North and South America is real, not merely due to American forms being still undiscovered.

being as indicated in the figure. *Abdomen.* ♂: True basal tergite small, bare, not clearly separated from second; the following tergites are densely bristled; surfaces of tergites 2–5 thickly covered with fine, short, erect bristles, the bristly area on the fifth being very short; tergites 3–6 have their chitinous parts progressively shorter, and in the sixth this part is so short that there is no room for surface-bristles except at the sides; marginal bristles moderately long on tergite 2, from moderately to very long (and strong) on tergites 3–6; anal segment bare above in its basal half, but with erect bristles of moderate length on the posterior half of its dorsal surface and on the sides, long outstanding bristles on either side before the hind angles, and a series of fairly long bristles across the hind margin. Ventrally, the ctenidium along the margin of the basal sternite is reduced to about twelve

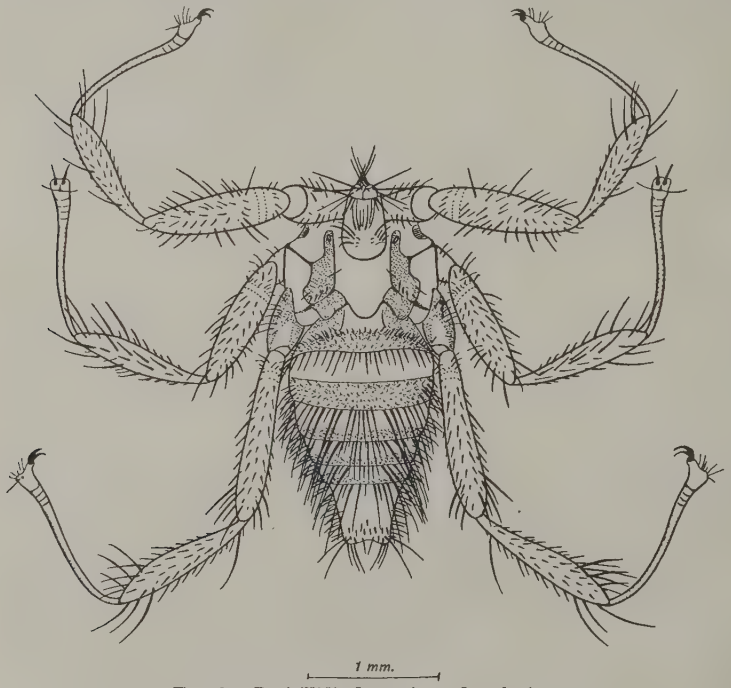

Fig. 1.—*Penicillidia buxtoni*, ♂, dorsal view.

very short and rather fine teeth, widely spaced, and alternating nearly regularly with ordinary bristles, which are moderately long in the middle and very long towards the lateral margins; surface of basal sternite bare right at the base, otherwise rather closely covered with fine short bristles, decumbent and directed backwards except at the sides, where they are erect and turned outwards. Sternites 2 and 3 have the marginal series rather irregular, two, three or more short bristles stand between each two long ones, and the surface is bare in the middle except for a sparse irregular series of fine short bristles in front of the marginal series; at the sides the surface is covered with short erect bristles and the margins bear very long bristles, some erect, others directed backwards. Sternite 4 has an irregular transverse group of short, sharp, teeth on the middle part of its hind margin, the median basal part of the surface is bare, and the hind part bears rather sparse,

short, erect bristles with very long ones at the sides near the hind margin. Claspers with their outer margins sinuate, not regularly arcuate as in *P. oceanica* (cf. fig. 6 in the description of that species by Falcoz, cited below).

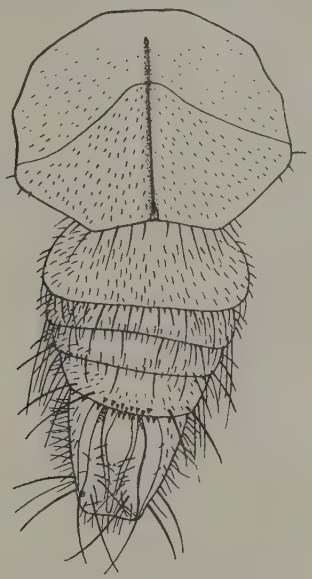

FIG. 2.—*Penicillidia buxtoni*, ♂, ventral view of thorax and abdomen (scale $\frac{1}{5}$ larger than fig. 1).

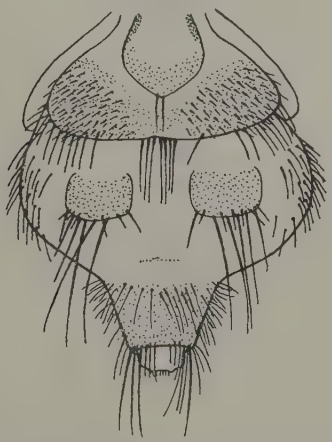

FIG. 3.—*Penicillidia buxtoni*, ♀, dorsal view of abdomen (same scale as fig. 2).

♀: Basal tergite rather small and narrow, widening from its base to about the middle of its length, then tapering to an obtuse apical angle which bears from two to four rather long bristles, apart from which it is entirely bare; it nearly divides into two halves the

chitinous part of the large second tergite, the surface of which on either side is densely covered with short erect bristles, while the hind margin has a series of from eight to ten moderately long bristles on either side and a group of about seven in the middle. Behind this is a large area of whitish connexivum, bare except at the sides, where it is fairly densely covered with bristles of moderate length; it bears two nearly quadrangular chitinous plates, each with about six long stout bristles on its hind margin, the inner ones very long; a few short bristles stand just in front of the marginal series, the rest of the surface of each plate is bare; behind these a transverse median fold is visible in the connexivum; anal segment short, tapering, subtruncate, with surface above mostly bare, erect bristles of medium length at base, on its sides, and across the hind margin, those at the hind angles being very long; the anus itself is on a very short narrower extension, projecting behind the marginal series of bristles as a chitinised ring fringed with fine hairs. Ventrally, the basal sternite has its ctenidium even more reduced than in the ♂, there being only a few very short teeth on either side and none in the middle, where two or more short, fine,

Fig. 4.—*Penicillidia buxtoni*, ♀, ventral view of abdomen (same scale as fig. 2).

ordinary bristles are set between each two long ones; surface bare at the base, otherwise rather sparsely covered with short fine bristles, all decumbent and directed backwards; behind this is a large area of connexivum, bare at the base, then densely covered with short bristles and with a curved transverse series of eight very long bristles. Behind this, two nearly ovoid chitinous plates, their hind margins set with bristles of varying lengths, their surfaces bearing six or seven erect bristles (on each plate) just before the hind margin, the outer ones of which are very long. Behind these, a short transverse chitinous part,* with hind margin closely set with moderately long bristles, short erect bristles on the surface just before the margin, and long (or very long) erect bristles in a dense group on either side. Subgenital plate bilobed, densely covered with erect bristles, those at the apices of the lobes being very long.

New Hebrides: Espiritu Santo, Hog Harbour, 21.vii.1925, from *Miniopterus australis*, Tomes (Oldfield Thomas *det.*), 1 ♂ and 1 ♀ (types) and 6 ♀ paratypes (one bearing an almost completely extruded larva) (*P. A. Buxton*);

* The outline of this transverse chitinous area is not very sharply defined and is not indicated in fig. 4.

Tanna, 22.ix.1925, from *Miniopterus australis*, 1 ♂, 2 ♀ (*P. A. Buxton*); Espiritu Santo, Hog Harbour, 17.ii.1927, from *Miniopterus australis*, 2 ♂, 2 ♀ (*J. R. Baker*).

Affinities. This species and *P. oceanica* constitute an extreme development along a certain line within the genus *Penicillidia*. In the great reduction of the abdominal ctenidium they approach the genus *Eremoctenia*, Scott, the type (and hitherto only known) species of which, *E. progressa* (Muir), Scott, occurs in Amboina on *Miniopterus*.* *P. buxtoni* and *P. oceanica*, however, retain some vestige of the abdominal ctenidium, while they have the lateral thoracic ctenidia normally developed; but these latter are partly hidden under folds of the connexivum, which may possibly be a step in the direction of their disappearance (they are quite absent in *Eremoctenia*). The presence of ocelli (organs entirely wanting in *Eremoctenia*) also helps to determine the position of these two species in the genus *Penicillidia*.

A more elementary stage in the reduction of the abdominal ctenidium is seen in the widespread Oriental species, *Penicillidia jenynsi*, Westwood, the teeth being in that species rather far apart in the middle. *P. jenynsi* and *P. buxtoni* also exhibit some resemblances in the form of the abdomen in both sexes, notably in the underside of the ♀ abdomen; cf. Scott, 1908, *Trans. Ent. Soc. Lond.*, **1908**: 360–362, pl. xviii, figs. 1–5.

Penicillidia oceanica (Bigot).

Nycteribia oceanica, Bigot, 1885, Ann. Soc. ent. Fr., **1885**: 246.
Penicillidia oceanica (Bigot), Falcoz, 1923, *in* Sarasin et Roux, Nova Calédonia (Zool.), **3**, (i): 86–89, figs. 5–8.

Distribution: New Caledonia; Queensland.

The original description, based on specimens from New Caledonia, without record of host, was inadequate, and the species was fully redescribed and figured in both sexes by Falcoz, again from New Caledonian material, some of the specimens having been found on *Miniopterus australis*, others on an undetermined bat; I had previously compared examples with Bigot's original types for Dr. Falcoz. Two records from Queensland can now be added: Mossman, from "*Miniopterus schreibersi*," † 1 ♂, 2 ♀ (*Frederick Muir*, No. 471) and Townsville, 1927, 1 ♂, 2 ♀, without record of host (*G. Dennes*).

These are the first authentic records of the species from Australia, since the record of a single ♂ from New South Wales, published by Speiser in 1901, has been shown by Falcoz not to refer to this species.

Nycteribia, Latreille. Subgenus Listropodia, Kolenati.

Nycteribia (Listropodia) bakeri, sp. n.

Very close to, and in some respects intermediate between, *N.* (*L.*) *parilis*, Walker (Scott, 1914, *Ann. Mag. Nat. Hist.*, (8), **14**: 230–234, pl. xii, figs. 20–24), which is known from Amboina, the Moluccas and Australia, and *N.* (*L.*) *sarasini*, Falcoz, 1923 (*Nova Calédonia* (*Zool.*), **3**, (i): 89–93, figs. 9–12), which is recorded from New Caledonia, the Loyalty Is. and Queensland.

Length (front of sternal plate of thorax to hind end of abdomen) approximately 1·75 mm. *Thorax* with sternal plate about as broad in its widest part as it is long; its hind margin bears some longer bristles, including one very long bristle on either side just within

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* 1917, *Parasitology*, **9**: 600–605, pl. xxiv.

† This almost certainly refers to *Miniopterus australis*, now treated as a distinct species.

the hind angle (as in *N.* (*L.*) *parilis*). *Legs*: the form (typical of the subgenus) and proportions of length to breadth are shown in fig. 5. *Abdomen.* The diagnostic characters are indicated in fig. 6 and can be best stated in tabular form, which will also serve to show the differences between the three species.

N. parilis.	*N. bakeri.*	*N. sarasini.*
	Both sexes.	
First sternite with posterior row of surface bristles fairly short, of equal length.	First sternite with posterior row of surface bristles including about four to six which project beyond the apices of the ctenidial teeth.	First sternite with posterior row of surface bristles fairly short, of equal length.
	♂ *only.*	
Claspers longer, more slender, arcuate towards apex, which is acute.	Claspers shorter and broader, nearly straight but convergent, with inner margin obliquely cut away towards apex, which is subtruncate.	Claspers shorter and broader, convergent, with apical portion bent upwards and apex emarginate, almost bifid.
Surface of 3rd sternite with relatively few bristles, that of 4th sternite almost bare.	Underside very bristly, the surfaces of sternites 2, 3 and 4 all covered with numerous short erect or sub-erect bristles. (The very long erect bristles on the hind margins, four on sternites 2 and 3, two on sternite 4, are very marked.)	Underside less bristly, surface of sternite 4 almost bare.
	♀ *only.*	
Tergite 2 with surface almost bare, marginal bristles weaker.	Tergite 2 with surface-bristles fairly close in middle part, marginal bristles stronger and longer.	Tergite 2 with surface glabrous, marginal bristles relatively short.
Membranous part of tergite 3 fairly widely covered with scattered moderately long bristles.	Membranous part of tergite 3 fairly widely covered with scattered moderately long and strong bristles; one or two postero-lateral bristles on either side situated apart from the rest, on the membrane.	Membranous part of tergite 3 with only a small part of the surface bristled.
Anal segment with two separate dorsal chitinous plates, their surfaces bare, a curved series of short thorn-bristles along the hind margin of each (the two series convergent in front).	Anal segment with two separate dorsal chitinous plates, each with two transverse series of 2–4 (usually 3) short thorn-bristles in front of the middle.*	Anal segment with two separate dorsal chitinous plates, the short thorn-bristles forming a single irregular transverse series and apparently variable in number.

* In one example there is only one transverse series.

The most definite characters of *N. bakeri* lie in the very distinct form of the ♂ claspers, and the long bristles on the hind part of the surface of the basal sternite, which project beyond the teeth of the ctenidium in both sexes. In the ♀, the arrangement of the thorn-bristles on the dorsal chitinous plates of the anal segment is much closer to that in *N. sarasini*, but the bristling of the middle part of the surface of tergite 2, and of the membranous portion of tergite 3, more nearly resembles the arrangement in *N. parilis*. The two very long marginal bristles near the hind angles of the sternal thoracic plate are of about the same length as those of *N. parilis*, and longer than those of *N. sarasini*.

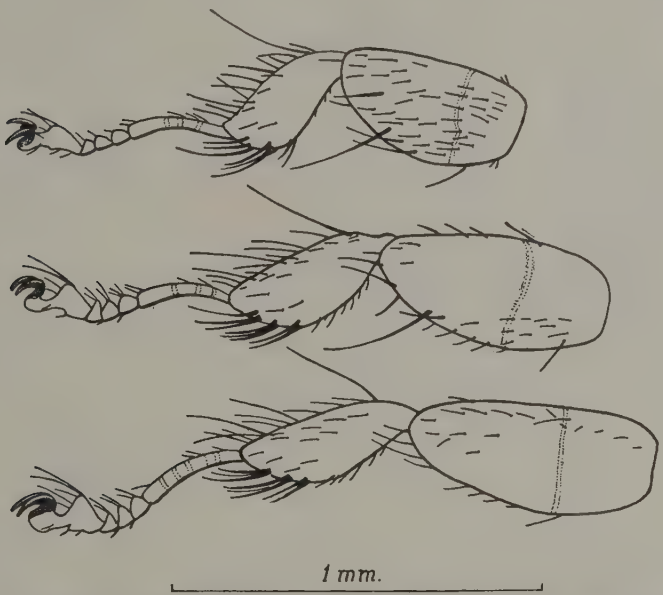

Fig. 5.—*Nycteribia* (*Listropodia*) *bakeri*; from top to bottom, right front, middle and hind legs, viewed from in front.

New Hebrides: Tanna, 22.ix.1925, from *Miniopterus australis*, Tomes (Oldfield Thomas *det.*), 2 ♂ and 3 ♀ (including the ♂ and ♀ types) (*P. A. Buxton*); Espiritu Santo, Hog Harbour, 15.ii.1927, from *Miniopterus australis*, 3 ♂ and 4 ♀, also 1 ♂ from the same place and the same species of bat, 20.iii.1927 (*J. R. Baker*).

Cyclopodia, Kolenati. Subgenus Cyclopodia, s. str., Scott, 1917, *Parasitology*, **9**: 607.

Cyclopodia oxycephala (Bigot).

Nycteribia oxycephala, Bigot, 1860, Ann. Soc. ent. Fr. (3) **8**: 227.
Cyclopodia oxycephala (Bigot), Speiser, 1902, Z. Hymenopt. Dipt. **2**: 170; Falcoz, 1923, *in* Sarasin et Roux, Nova Calédonia (Zool.), **3**, (i): 93–96, figs. 13–16; *id.*, 1924, Bull. Mus. Hist. nat., Paris, **30**: 19.

Distribution: Loyalty Is. (Lifu); New Caledonia; New Hebrides. The host of the New Caledonian material is recorded as *Pteropus ornatus*, Gray.

Originally inadequately described by Bigot, this species was placed in its right generic position by Speiser, and has been fully re-described, with figures of the dorsal and ventral surfaces of the abdomen in both sexes, by Falcoz.

It has not previously been recorded from the New Hebrides, but the following records from that archipelago can now be published : Espiritu Santo, Hog

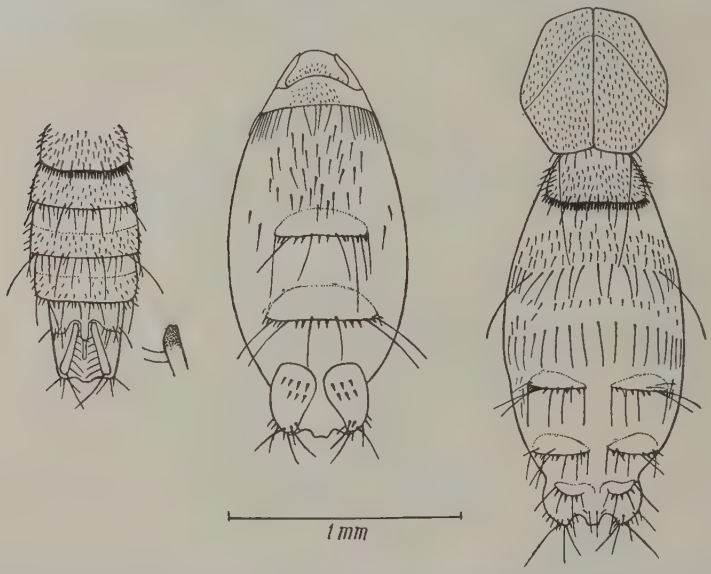

Fig. 6.—*Nycteribia* (*Listropodia*) *bakeri* ; from left to right, ventral view of ♂ abdomen (with apex of one clasper more highly magnified), dorsal view of ♀ abdomen, ventral view of ♀ thorax and abdomen.

Harbour, 17.i.1927, on "N'Kara Kara" (*Pteropus eotinus*, K. And.), 1 ♂, 1 ♀ (*J. R. Baker*); Elephant Island (a small islet off the coast of Espiritu Santo, near Hog Harbour), 1927, from three examples of *Pteropus geddiei*, MacG., respectively 2 ♂, 1 ♀, and 1 ♂, 1 ♀ (*J. R. Baker*); Malekula, Ounua, iv–v, 1929, from fruit-bat (species undetermined), 2 ♂, 1 ♀ (*Miss L. E. Cheesman*).

SOME NYCTERIBIIDAE FROM THE AUSTRALIAN REGION. PART II: ON CERTAIN SPECIES OF *CYCLOPODIA*

By Hugh Scott, Sc.D., F.L.S., F.E.S.

The four species reviewed below all belong—like *C. oxycephala*, on which comments were made at the end of the preceding paper—to the subgenus *Cyclopodia s. str.*, in which the dorsal surface of the head between the eyes is flattened and the anterior coxae are elongate. The hosts are always the large frugivorous bats of the family Pteropidae.

Cyclopodia albertisi, Rondani.

Cyclopodia albertisi, Rondani, 1878, Ann. Mus. civ. Genova, **12** : 150; Speiser, 1901, Arch. Naturg. **67**, 1 : 50, 64, 71, 73.
Nycteribia pteropus, Rainbow, 1904, Rec. Austr. Mus., **5** : 78, pl. ix.
Cyclopodia pteropus, Ferris, 1924, Amer. Mus. Nov., **110** : 5, fig. 5; Musgrave, 1925, Rec. Austr. Mus. **14** : 300.

I have recently had before me a ♂ labelled "typus" and a ♀ from among the type-material of *C. albertisi*, kindly lent by Dr. Gestro from the Genoa Museum, and specimens of both sexes of *C. pteropus*, which have been compared with the types, sent by Mr. A. Musgrave from the Australian Museum; also other material from several sources, in some cases not previously recorded, but listed below. The types of *C. albertisi* were mounted dry, but I have carefully floated them off their cards, and examined both upper and lower surfaces.

After critical examination of this material I have no doubt that *N. pteropus* is identical with *C. albertisi*. The distinguishing characters of the species lie in the chaetotaxy of the ♀ abdomen, which has four to six stout, very short setae borne on tubercles in the middle of the dorsum, and a small lateral cluster of long setae on either side near the apex.

The question has been raised by Ferris and Musgrave (*loc. cit.*) whether *C. similis*, Speiser, is also synonymous. But, for reasons given below, this is retained as a distinct species.

Distribution: Moluccas (Goram); Australia (Queensland and New South Wales); New Guinea and Salwati I.; Kei Is.

Moluccas: the type-material of *C. albertisi* was collected in Goram from *Pteropus* sp. Australia; the localities and hosts, as given by Musgrave, comprise the mouth of the Batavia River, Gulf of Carpentaria, from *Pteropus gouldi*, Gray (type-material of *N. pteropus*); Babinda Creek, Queensland, from *Pteropus conspicillatus*, Gould; North Barnard Is., South of Cairns, Queensland, a series from *Pteropus conspicillatus*; and Sydney, N.S.W., from *Pteropus poliocephalus*, Gould; to these may now be added Olive River, York Peninsula, North Queensland, 12.viii.1923, from *Pteropus gouldi*, 6 ♂, 5 ♀ (*G. H. Wilkins*, W.A.I. Expedition, in Brit. Mus.), and Mossman, Queensland, from *Pteropus* sp., specimens of both sexes collected by the late *Frederick Muir* (No. 472, q.). New Guinea: Port Moresby, iv.1910, "from white-necked fruit-bat," 6 ♂, 3 ♀ (*F. Muir*, No. 470). Salwati I.: Samate, 15.i.1930, from undetermined flying-fox, 4 ♂, 3 ♀ (*M. von Kühlewein*). Kei Is.: Kei Toeal, 5.i.1930, 4 ♂, 6 ♀ (*M. von Kühlewein*). The last two lots of material were recently received at the British Museum through Dr. K. Jordan.

Variation. The series from the Kei Islands consists of very large specimens (4½ to nearly 6 mm. long, the latter measurement being that of a gravid ♀),

much larger than those from Salwati I., or Port Moresby, or the Olive River, Queensland (4 to 4½ mm.). Musgrave remarked on the variation in size of Australian examples. In the ♀ there is also considerable diversity in the number and arrangement of the large dorsal tubercles on the middle of the abdomen, and of the long postero-lateral abdominal bristles; thus, in the series from the Olive River, one ♀ has only two long bristles on each side, two ♀ have three each side, one ♀ has five each side, and one ♀ has six on one side and seven on the other, this last having two additional long bristles situated quite irregularly on the hind dorsal part of the abdomen; the large mid-dorsal tubercles vary from four to six in the same series of specimens. Similar variations in the chaetotaxy occur in other species of this genus.*

Cyclopodia similis, Speiser.

Cyclopodia similis, Speiser, 1901, Arch. Naturg., **67**, 1 : 51, 64, 71, 73, pl. iii, fig. 5.

There are before me a ♂ and a ♀ from among the original type-material, acquired by exchange with the Berlin Museum, and some previously unnamed examples, listed below.

As stated above, it has been suggested that *C. similis* may be identical with *C. pteropus* (= *C. albertisi*), but I regard the two as separate. The distinguishing characters again lie in the chaetotaxy of the ♀ abdomen; this has (as in *C. albertisi*) a lateral cluster of long setae on either side near the apex, but instead of possessing only a small group of very short setae on tubercles on the dorsum, it has an elongate bristly area on the middle of the dorsum extending for some distance, yet not uniting with the lateral clusters. The elongate bristly area bears approximately between 12 and 20 setae, arranged in a number of irregular transverse series. In the type-material the longitudinal bristly area was correctly described by Speiser as a "rhombic or triangular field," and the bristles are regularly arranged, short in front and progressively longer behind, but in the other material now referred to this species the arrangement is not always so regular. Some ♀ examples also exhibit a group of bristles, slightly longer than the very short bristles with which all the remaining parts of the connexivum are covered, on either flank, at about the middle; but this is not apparent in the ♀ cotype before me. As further modifications of the abdominal chaetotaxy, if we imagine the bristly strip on the ♀ abdomen set rather further back, and the lateral clusters extended and united with it and with one another across the hind part of the dorsum, we arrive at the arrangement presented by *C. horsfieldi*, de Meijere (a species known from the Malay Peninsula, Java, Sumatra and the Philippines); while, on the other hand, if the lateral clusters disappear altogether, and the median bristly area alone persists, we have the condition seen in the Samoan species, *C. inclita*, Falcoz (1927, *Insects of Samoa*, Brit. Mus. (N. H.), **6**, (1) : 5–9, figs. 4–7).

Distribution. Originally recorded by Speiser from New Britain (Neu-Pommern), New Ireland (Neu-Mecklenburg), the Fiji Is., and, doubtfully, from Celebes. The cotypes before me are from New Britain. Considering the similarity of this and the foregoing species, both Fiji and Celebes should be accepted with reserve. Several forms of *Pteropus* are listed by Speiser as hosts. I refer to this species the following material, hitherto unrecorded, from the Timorlaut Is.: Larat, "from large fruit-bat," 3 ♂, 4 ♀ and 2 larvae (*Frederick Muir*, No. 421).

* I dealt with analogous variations in the ♀ in a long series of *Cyclopodia sykesi*, Westw., from Ceylon, in 1908, *Trans. Ent. Soc. Lond.* **1907** : 423, 424, fig. 1.

I doubt if this form will be found in Australia and think Musgrave is certainly right in referring to *C. albertisi* (*pteropus*) a pair of examples in the Australian Museum formerly labelled as *C. similis* (1925, *Rec. Austr. Mus.*, **14**: 300).

Cyclopodia pembertoni, sp. n.

A very distinct species, the chief diagnostic characters being: (i) in both sexes the smallness of the eyes; (ii) in the male the very bristly abdomen, the tapering, sharp-pointed claspers and the rather numerous short black teeth in the middle of the hind margin of sternite 4; (iii) in the female, the form of the basal tergite and basal sternite; the abdominal connexivum closely and evenly covered above and beneath with *large* tubercles, bearing short bristles, which become gradually longer at the sides and behind, but without

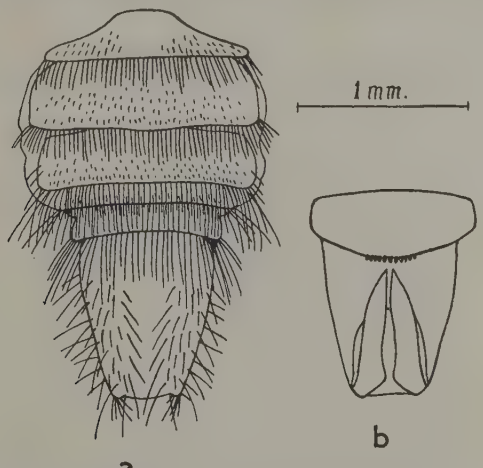

Fig. 1.—*Cyclopodia pembertoni*, ♂; *a*, dorsal view of abdomen; *b*, ventral view of sternite 4, anal segment and claspers, in outline (bristles omitted).

any sharply defined group of larger tubercles or longer bristles in the middle of the dorsum; and the very curious form of the subgenital plate, from the base of which rises a large backward- and upward-curved prominence like a blunt horn.

Length (front of thoracic sternal plate to end of abdomen) *ca.* 3·5 mm. (♂)—*ca.* 4·25 mm. (gravid ♀). *Head* quite bare of bristles except for a few short ones along the lower margins of the cheeks, and flattened dorsally in the manner characteristic of the subgenus. *Eyes* much smaller than in some species of the subgenus (e.g. *C. minor*), black-pigmented, little raised above the surrounding surface; the number of facets is indistinct, but apparently each eye is composed of two. *Thorax* with the sternal plate a little broader (about one-sixth) in its widest part than its length; the median longitudinal groove is obsolete in the middle part of its length but reappears as a deep depression at the hind end. *Abdomen.* ♂: True basal tergite only discernible as a small area of whitish membrane, not clearly separated from tergite 2, and not shown in fig. 1*a*, bearing a few minute point-like bristles. Otherwise the whole dorsal surface looks very bristly. Tergites 2, 3 and 4 have moderately long bristles, set close, along their hind margins, and

also short bristles (but considerably longer than in some allied species) on their surfaces; on tergite 2 these surface-bristles are only present near the hind margin, on tergites 3 and 4 they extend in several irregular transverse series across all the posterior half of the surface; tergites 5 and 6 short, with long bristles on their hind margins, the surface of 5 has short surface-bristles, that of 6 is bare; anal segment bare only near the base and along the mid-dorsal line, otherwise the erect bristles are dense and long on the dorso-lateral and ventro-lateral parts. Ventrally, the teeth of the ctenidium on the basal sternite are long

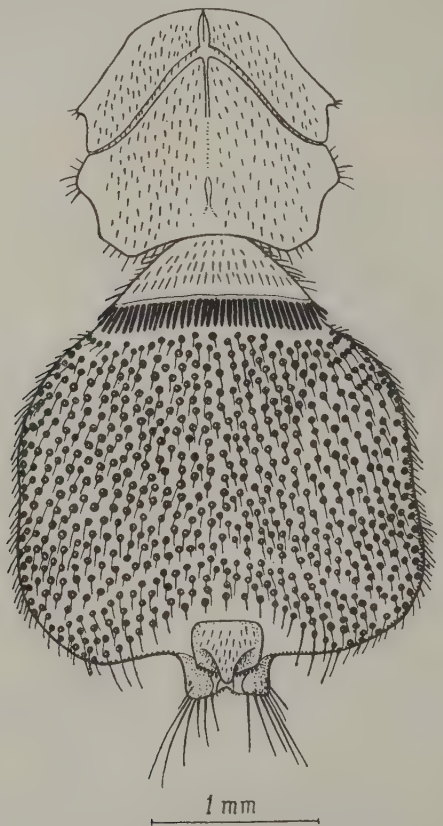

Fig. 2.—*Cyclopodia pembertoni*, ♀, ventral view of thorax and abdomen.

and strong, over forty in number; sternites 2 and 3 have their surfaces densely covered with short bristles, longer erect bristles at the sides, turned obliquely outwards, and longer bristles on the hind margin; sternite 4 is produced backwards in the middle, with a ctenidium of about ten short, blunt, stout, black teeth in the middle of the hind margin; the surface of this sternite is bare at the base, but very bristly behind, with specially dense, erect, long bristles, turned outwards, at the sides; claspers rather broad, but curved upwards and markedly tapering to a sharp point, dark-pigmented towards the apex.

♀: The peculiar broad, suboblong form (shown in fig. 2) of the abdomen in the only ♀

example is due, presumably, to a certain phase of gravidity; at the base is a small chitinous tergite, its arcuate hind margin closely set with long bristles, and the hind part of its surface covered with short bristles; the entire connexivum is closely and evenly covered with large, raised, dark-pigmented tubercles, from each of which rises a bristle; these bristles are very short in front, but get gradually longer behind and on the flanks; there are no extra-large tubercles in the middle of the dorsum (as in several species of the subgenus), but in the postero-median part of the surface the bristles rising from the ordinary tubercles are long, forming a dense group; anal segment truncated, consisting of two lateral chitinous, dark-coloured pieces, divided by a narrow median soft whitish portion; it has a half-circlet of about nine long and stout bristles round the apical margin of each chitinous piece, and about two shorter bristles on either side standing just outside the bases of the marginal half-circlet, but is otherwise bare. Ventrally, the basal sternite is strongly narrowed to the base, its surface bears short bristles (as in the ♂) and the teeth of the ctenidium are about 40 in number; the entire connexivum is closely and evenly covered with large, dark tubercles, as on the dorsal surface, but the bristles are short throughout, only slightly longer behind, with two or three on either side markedly longer in the hindmost row of tubercles; there is a slight trace of a division between two segments in the hind part of the tuberculate connexivum; subgenital plate chitinous, dark-coloured and of very peculiar form; ventrally and in front it is produced into a stout blunt horn, covered with short bristles and slightly curved upwards; behind this horn the plate is bent upwards, bare, and has its hind margin arcuate-truncate, set with very short, stout, black teeth, blunt and close together.

Fiji: Lami, Viti Levu, host and date of capture unrecorded, 1 ♂ and 1 ♀ (types) and 1 ♂ paratype (*C. E. Pemberton*). The material was sent me by Dr. F. Muir in January, 1921.

Affinities. *C. pembertoni* occupies a rather isolated position among the species of the subgenus. In the ♂ the marginal series of bristles on the anterior tergites are continuous, while in the other species from the same region they are widely interrupted in the middle. In the ♀ the remarkable basal horn on the subgenital plate has no counterpart in other species. *C. oxycephala* (see above, p. 23) and *C. minor* (see below) agree with *C. pembertoni* in having no group of extra large tubercles or longer bristles in the middle of the dorsal surface of the abdominal connexivum of the ♀, but *C. pembertoni* differs in the large size of all the tubercles covering the connexivum both dorsally and ventrally, and in the bristles being longer behind on the dorsal surface.

Cyclopodia minor, Speiser.

C. minor, Speiser, 1901, Arch. Naturg., **67**, 1: 55, 64, 70, 73.

I have no new material of this species to record, but having before me a pair of examples lent by the Berlin Museum from the original type-material, I take the opportunity of supplementing Speiser's description with the following notes and figures. The head has a few bristles on the front margin of the vertex between the eyes, and a few others on the dorsal surface further back. The sternal plate of the thorax is narrower in proportion to its length than in *C. pembertoni*, appearing (without accurate measurement) about as broad at its widest point as its length. Fig. 3*b* shows the dorsal surface of the abdomen in the ♂; it will be seen that the marginal series of bristles are broadly interrupted in the middle on tergites 2 and 3, and the bristles of all the marginal series are shorter than in *C. pembertoni*; the surface-bristles on tergites 2 and 3 are extremely short and not very close, they are almost absent

on tergite 4 and quite absent on tergites 5 and 6; the large size of the anal segment is also shown, but the ratio of length to breadth cannot be precisely determined owing to its curvature; ventrally, sternites 2, 3 and 4 have short bristles on the surface and marginal series of longer bristles, there is also a submarginal series of long erect bristles, seven or eight on either side of the middle, on sternite 4; the short, black, blunt teeth in the middle of the hind margin of sternite 4 number only six, and the claspers are broader and blunter by comparison with *C. pembertoni*.

In the ♀, the chitinous tergite at the base is rather large, its surface is covered with very short bristles, its hind margin is broadly and very shallowly

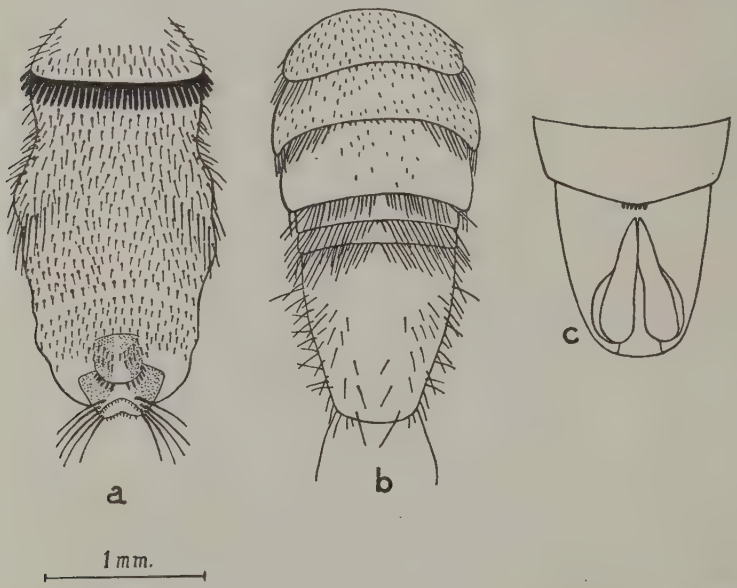

Fig. 3.—*Cyclopodia minor*; *a*, ♀, ventral view of abdomen; *b*, ♂, dorsal view of abdomen; *c*, ♂, ventral view of sternite 4, the anal segment and claspers, in outline (bristles omitted).

sinuate, and there is a marginal series of about seven rather long bristles, not very close, on either side of the sinuation; the dorsal connexivum is covered with smaller tubercles than those of *C. pembertoni*, and the bristles rising from them are so short and minute as to be only visible under a high power; longer bristles are entirely absent on the dorsal surface, but on the flanks and ventro-lateral parts of the connexivum the bristles are longer, as shown in fig. 3*a*. This figure also shows the form of the subgenital plate, suboblong with curved hind margin, the black teeth on which are less close together than in *C. pembertoni*; the surface of the plate is brown and chitinised on either side, whitish along the middle, and two irregular series of very short bristles extend obliquely across either half.

Matupi, a little island near New Britain [Neu-Pommern], on *Pteropus admiralitatum*, Thomas, iii.1897 (*Dahl*); see Speiser, *loc. cit.*

A NOTE ON *ICERYA AEGYPTIACA*, DOUGL. (COCCIDAE), AND SOME NEARLY RELATED SPECIES

By E. Ernest Green, F.E.S.

A careful study of the dermal pores of a series of *Icerya*, that—from superficial characters—I had referred to *aegyptiaca*, has revealed the fact that the series included several distinct species. This discovery has necessitated the erection of one new species and the reinstatement, as a distinct species, of *Icerya tangalla*, Green, which had been sunk as a synonym of *aegyptiaca*. Though easily confused in life, they are readily separable by the characters of the dermal pores, which

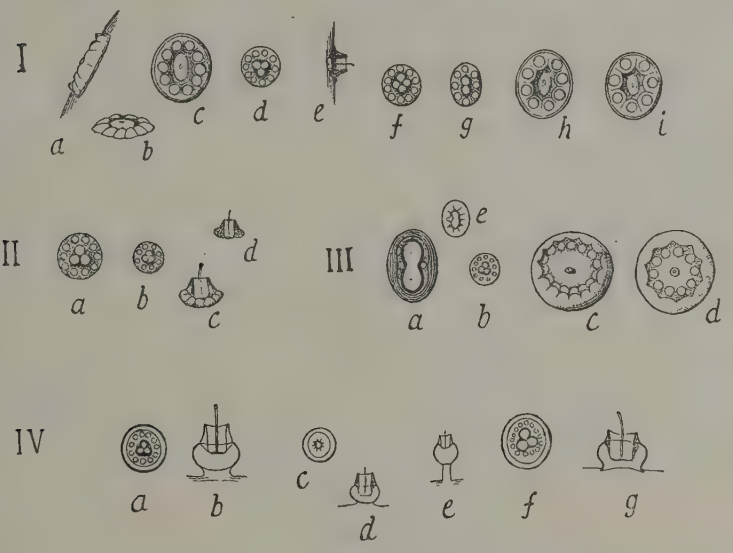

Fig. 1.

I. *Icerya aegyptiaca : a, b, c, h, i,* dorsal pores; *d, e, f, g,* ventral pores.
II. *I. tangalla : a, c,* dorsal pores; *b, d,* ventral pores.
III. *I. zimmermanni : a,* large bilobed pore from frontal area; *b,* ventral pore; *c, d,* dorsal pores; *e,* small bilobed pore from venter.
IV. *I. jacobsoni : a, b, f, g,* dorsal pores; *c, d, e,* ventral pores.
(All magnified 900 diameters.)

are of three main types :—(1) larger beaded pores with prominent rim and depressed median area; (2) smaller beaded pores with prominent (usually) trilocular centre; (3) heavily rimmed pores with depressed bilobed median area. Each of these types may vary in size, and show slight modifications, on different areas of the same insect. Examples of the first type are shown, in the accompanying figure, at I, *c, h, i,* and III, *c, d*; the second type is represented at I, *d,* II, *a, c,* III, *b,* and IV, *a*; the third, at III, *a.* It should be mentioned that I have found it difficult to interpret the exact structure of the pores, owing to the fact that—under such high magnification—their appearance changes with the slightest alteration of focus.

The following key may help in the differentiation of the several species with which the present note is concerned :—

A. Dorsum with pores of types 1 and 2 only ; pores sessile . . . *aegyptiaca.*
B. Dorsum with pores of types 1, 2 and 3; pores sessile . . *zimmermanni*, sp. n.
C. Dorsum with pores of type 2 only.
a, pores sessile . . . . . *tangalla.*
b, pores pedicillate . . . . . *jacobsoni.*

All the species have, in addition, a group of type 1 pores on the venter, surrounding the genital orifice.

Icerya aegyptiaca (Dougl.).

The pores, in this species, are of two types and sizes. The larger form is chiefly confined to the dorsum, more particularly to the area immediately behind the frons; but a large and scattered group surrounds the genital orifice. They are relatively large, subcircular or ovate (I, *c*, *h*, *i*), each with a depressed median area surrounded by a ring of from 7 to 10 circular cells which are situated within a prominent crenulate rim. In the middle of the depressed area is an ovate areole, which appears to be slightly raised, with a minute central orifice. In full profile (*a*) the prominent rim only is visible. Other pores, in half profile (*b*), display a more sloping rim. The smaller form (*d*, *f*, *g*) is principally found on the venter, though a few are distributed, amongst the larger pores, on the dorsum. These pores are either circular or ovate, with an outer ring of from 8 to 10 small circular cells, within which is a prominent trilocular (occasionally bi- or quadri-locular) area. In profile (*e*), this median area is seen to project far above the surrounding rim. A slender hyaline tongue arises from the base of the pore. In some preparations this tongue is not noticeable; in others, it is distinct and sometimes deeply stained.

I have been able to examine type material from the late J. W. Douglas's collection in the National Museum. My own collection contains examples of *aegyptiaca* from Egypt, India, Burma, Siam, Ceylon and Australia, the food-plants including *Psidium*, *Codiaeum*, *Ficus*, *Rosa*, *Montanoa*, *Anona* and a species of palm.

Icerya zimmermanni, sp. n.

Dorsum of living insect clothed with long, white, curling, waxy tassels, as in *aegyptiaca*, which it closely resembles. Antennae, limbs and body setae as in *aegyptiaca*. Derm of dorsum with numerous large circular pores of type 1—rather larger than the corresponding pores of *aegyptiaca :* each with a large depressed median area, surrounded by a ring of from 10 to 15 bead-like cells and a stout crenulate rim (see III, *c*, *d*). In addition, there are numerous conspicuous ovate pores (III, *a*), each with a heavily chitinous rim surrounding a depressed bilobed central area, on one side of which there is usually a single small circular cell, the other side being occupied by an ill-defined series of smaller cells. Derm of venter with small trilocular cells of type 2 (III, *b*); also—principally on the abdomen—some smaller ovate pores (III, *e*), each with a crenulate rim and obscurely bilobed depressed central area. Ovisac band composed of pores of type 2.

On *Melastoma* sp.; Java (coll. *A. Zimmermann*).

Icerya tangalla, Green.

The species originally described under this name (1896, *Ind. Mus. Notes*, **4**: 7) was subsequently referred to *aegyptiaca*, which it so closely resembles. My study of the dermal pores of the group has now convinced me that it is really distinct. It differs in the complete absence from the dorsum of beaded

pores of type 1, pores of this type being confined to the genital area. Larger pores, of type 2 only, are distributed over the dorsum (II, *a*, *c*); smaller pores of similar structure (II, *b*, *d*) occur on the venter and compose the ovisac band.

My collection contains examples from Ceylon and India only, the food-plants being *Nesaea*, *Bragantia*, *Trema*, *Codiaeum*, *Asystasia* and Sago Palm.

Icerya (*Crypticerya*) *jacobsoni*, Green.

In my original description of this species (1912, *Tijds. v. Ent.*, **55** : 316) I laid stress upon the presence of conspicuous nude bands on each side of the dorsum. I now find that, in fully mature examples, these bare areas are obscured by subsequent encroachment of the adjacent waxy patches, in which condition there is little to distinguish the insect from *aegyptiaca*. The structure of the pores, however, is characteristic. These pores, viewed from above (IV, *a*, *f*), show the structure of type 2, with trilocular centre and surrounding ring of bead-like cells. But, seen in profile (IV, *b*, *d*, *e*, *g*), they appear distinct from those of any other species of *Icerya* known to me. They stand well out from the surface, with a more or less globular body, mounted on a longer or shorter pedicel. Sessile pores, of type 1, are present on the area surrounding the genital orifice only. There is no ovisac band.

My collection contains examples from Java (on *Dombeya*, *Castilloa* and *Persea*), India and Burma (on *Shorea* and *Tectona*).

Icerya pulchra (Leon.) has dermal pores similar to those of *tangalla*, but may be distinguished by compact tufts of long setae on each side of the abdominal segments, which are represented in *tangalla* by isolated setae only.

The species was originally described from Java; but I have examples from Singapore, where it occurred on *Michelia*, *Garcinia* and various palms.

Icerya minor, Green, is possibly only a small form of *pulchra*, having pores and abdominal setae as in that species. My material is from India (on *Mangifera*).

A NEW *THAUMALEA* FROM MT. LEBANON (DIPTERA, THAUMALEIDAE)

By F. W. Edwards, M.A., Sc.D.
(*British Museum, Natural History.*)

Thaumalea libanica, sp. n.

Thorax in both sexes light brown, as light as any European species. Cross-veins separated by hardly more than their own length. Wings with a faint brown tinge.

♂. Hypopygium very much as in *T. brevidens*, Edw., the tergite being rather swollen and rounded, with a pair of small teeth at tip; style (clasper) also similar in shape, but definitely bifid at tip and usually if not always with a small tooth dorsally near tip, somewhat as in *T. major*, Bezzi (though the slender apical portion of the style is short, as in *T. brevidens*); parameres stout, with a strong dorsal tooth beyond middle (not before middle as in *T. brevidens*).

♀. Ovipositor much as in *T. brevidens*, but no median projection between valves.

Mt. Lebanon : Becharré, 1400 m., 21–28.vi.1931 (*Zerny*).

Cotypes, 22 ♂♂, 7 ♀♀, in Vienna and British Museums.

This should perhaps be regarded as a race of *T. brevidens*, but apart from the differences in genitalia described above, it differs strikingly in the light brownish instead of blackish thorax.

A NEW SPECIES OF THE GENUS *UROTHEMIS* FROM SOUTHERN ARABIA, AND SOME COMMENTS ON THE SPECIES OF ODONATA INHABITING THE QARA MOUNTAINS

By Cynthia Longfield, F.E.S.

Mr. Bertram Thomas, just before making his historic crossing of the Rub'al Khali desert, collected during the months of Oct.–Nov. 1930 in the Qara Mountains of Southern Arabia.

Of 64 specimens of dragonflies presented to the British Museum, one is an interesting new species of *Urothemis*, described below. Of the other 8 species collected, the three most common Libellulines were *Orthetrum chrysostigma*, Burm., *Crocothemis erythraea*, Brullé, and *Trithemis annulata*, Beauv., which have a wide range over Africa, the two first reaching S. Europe. *Pantala flavescens*, Fabr., a Libelluline with an almost world-wide range, yielded two specimens, while four specimens of *Pseudomacromia torrida*, Kirby, and one of *Diplacodes lefebvrei*, Ramb., add two more Libellulines with a wide African range. The only Aeschnine collected, two specimens of *Hemianax ephippiger*, Burm., has been found in North and East Africa, Persia and Northern India, while the single species of the Coenagrionidae, *Ceriagrion glabrum*, Burm., has a range comprising the whole African continent.

Only two species showed any variation from type. All four specimens of *Pseudomacromia torrida*, 3 ♂♂ and 1 ♀, had exceptionally deep saffroning of the wings, and the general dimensions were on the small side. *Ceriagrion glabrum*, 3 ♂♂ and 2 ♀♀, also had the wings very deeply saffroned.

Urothemis thomasi, sp. n.

♂. *Venation.* Antenodal and postnodal cross-veins. $\frac{6\text{–}7 \mid 7\text{–}6}{6\text{–}5 \mid 5\text{–}6}$. One row of cells between *Rs* and *Rspl* in all wings. First row of discoidal cells next to triangle, 3 deep, followed by 2 deep for 7 or 8 rows. *Dimensions.* Length of abdomen 27 mm.; hind-wing 31 mm.; pterostigma 3 mm.; width of abdomen at 6th segment 2 mm. *Pterostigma.* Exceptionally small, covering one small cell of the M_4 and one-fourth of the next proximal cell. In no case does the pt. extend into the next distal cell, as in all the other known species. Colour light yellowish-brown. *Colouring.* Head:—Eyes dark brown above. Occipital triangle, vertex, frons, and clypeus, ochraceous. Labrum reddish-orange with a brown mark in the centre. Mandibles dark brown or black. Labium ochraceous with a black line down the middle lobe. Antennae black. Prothorax black. Synthorax:—Yellowish-brown, with the following lateral black markings: humeral suture for entire length; mesinfra-episternum, enclosing an elongated yellow spot; 1st lateral suture, extending to the base of the wings, and widening to include the metastigma; metinfra-episternum, enclosing a small triangular yellow spot touching the 2nd lateral suture; 2nd lateral suture, extending to the base of the wings and broadening out on to the met-epimeron. Poststernum black with a large oval yellow spot. Legs black, the tarsi dark brown. Abdomen and anal appendages bright reddish-brown, probably the 2nd to 5th or 6th segments almost scarlet in life. First segment with dorsum black. Wings hyaline. Veins and nervures light red-brown. A bright golden-brown patch at the base of all four wings. In the fore-wings the patch reaches to just beyond the 1st antenodal; not quite to the arculus; just beyond the cubito-anal nervure, and then obliquely backwards to the anal edge. In the hind-wing it reaches to the 2nd antenodal, proceeds in a more or less straight line through the triangle until it reaches vein A_2 of the anal loop, when it curves sharply round to the anal angle. In this golden-brown portion on the hind-wings, between

A_1 and A_3, is a small, roughly oval patch of dark brown, 4 cells wide by 2 deep. *Genital appendages.* The appendages of the 2nd abdominal segment agree fairly closely with the Indian *U. signata.* The hamule is moderately broad, but much shorter than the lobus. This latter is broader and rather squarer than in *signata.*

Urothemis thomasi is a smaller and slimmer insect than the known species of *Urothemis*, in which the abdomen mostly measures at the 6th segment 3–4 mm. in breadth. It resembles the two African species in venation, the Indian in the form of the genital appendages, and the Siamese *abbotti* in colouring.

I have much pleasure in naming this distinctive species after Mr. Bertram Thomas.

Type, 1 ♂ (No. 66), in British Museum. Southern Arabia, Qara Mountains, Ain al Rizab. 250 ft. 31.x.1930 (*Bertram Thomas*).

A TACHINID FLY PARASITIC ON THE BEE-HOLE BORER OF TEAK

By Daphne Aubertin, M.Sc., F.L.S., F.E.S.

This fly is the only known parasite of the Bee-hole Borer (*Xyleutes ceramica*, Walk.), a moth found in India, Burma and the Malay States.

The fly is of typical Tachinid appearance, dark grey-black in colour with the bases of the wings orange; this latter character gives it a conspicuous superficial resemblance to *Erycia basifulva*, Bezzi, also a Malayan fly, but an examination of the shape of the head indicates that it belongs to another genus.

According to Brauer & von Bergenstamm's key, this species should be placed in the genus *Podomyia*, B. & v. B. (1889, *Denkschr. math. nat. Akad. Wiss. Wien*, **56**: 96). The characterisation of this genus is not very helpful, and neither is the description of the genotype, *P. setosa*, Dol., (1858, *Nat. Tijd. Ned. Ind.*, **17**: 102), specimens of which I have unfortunately not seen. I have, however, seen paratypes of *P. langi*, Curr., the type of *P. kashmiri*, Toth. (described in the genus *Frontina*), and specimens of *P. setigera*, Corti, determined by Villeneuve, and consider that the fly under discussion is congeneric with these species. The Bee-hole Borer parasite is about 6 mm. long, while the other species referred to average 10–15 mm. in length; a difference in size, however, does not seem to be of sufficient importance to exclude this new species from the genus.

Podomyia atkinsoni, sp. n.

Head. Eyes bare, separated in ♂ by distance equal to $\frac{1}{4}$, in ♀ $\frac{1}{3}$, total width of head as seen from above; frons black, more or less parallel-sided, equal to one para-frontal in width; parafrontals, parafacials, face and jowls covered with silver-grey tomentum, the area separating parafacials and jowls reddish in certain lights; frontal bristles intermixed with finer bristles, descending to level of junction of second and third antennal segment, upper two or three bristles reclinate; two fronto-orbital bristles present in ♀ but none in

♂; inner and outer vertical, ocellar, and post-vertical bristles present in both sexes; parafacials bare; vibrissae ascending halfway up facialia; first and second segments of antenna rufous, third dark brown, 2–2½ times as long as second, arista bare, first and second segments short, third very slightly thickened basally; palpi orange. *Thorax.* Dark grey, lightly silver-dusted anteriorly, along the sides of the dorsum and on the pleurae; scutellum very slightly rufous at the tip. *Chaetotaxy:* acr. 3 + 4, dc. 3 + 4, intra-alars 2 + 3, supra-alars 2 + 3, 3 or 4 humerals, 2 notopleurals; scutellum with three pairs of marginal, one pair of discal, and backwardly directed, crossed apical bristles. *Abdomen.* Egg-shaped, greyish-black, very slightly silver-dusted on sides; a pair of marginal macrochaetae on first and

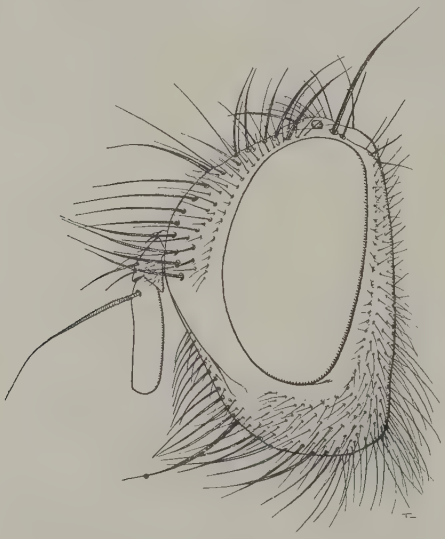

Fig. 1.—Lateral view of head of *Podomyia atkinsoni* (× 28).

second visible segments, a row on third segment and the fourth irregularly covered with macrochaetae; hypopygium hidden, the sternites in the ♂ rather thickly covered with bristles. *Wings.* Hyaline; veins and bases of wings orange; first posterior cell opens very narrowly, rather near the wing-tip; costal spine absent; a single fine bristle at origin of second and third longitudinal vein; basicosta black; subcostal sclerite covered with orange pubescence; squama and halteres orange. *Legs.* Black; claws and pulvilli in ♂ not noticeably elongated.

Length, 6 mm.

Burma: S. Toungoo, 5 ♂♂, 1 ♀ (*D. J. Atkinson*).

Type ♂ and ♀, and four ♂ paratypes: 26.1.31, one paratype 20.1.31, two 21.1.31, and one 23.1.31.

Types in the British Museum.

ON CORIXIDAE FROM UGANDA

By G. Evelyn Hutchinson, M.A., F.L.S., F.E.S.

(Osborn Zoological Laboratory, Yale University.)

The collections that form the basis of the present contribution were made by Messrs. G. H. E. Hopkins and G. L. R. Hancock and forwarded by them to the Imperial Institute of Entomology. Four species only are represented, but the material is of considerable interest as it increases our knowledge of the fauna of the Mount Elgon *massif*. My best thanks are due to Sir Guy A. K. Marshall, C.M.G., F.R.S., and to the collectors for this opportunity to report on the collections and for notes on the localities in the neighbourhood

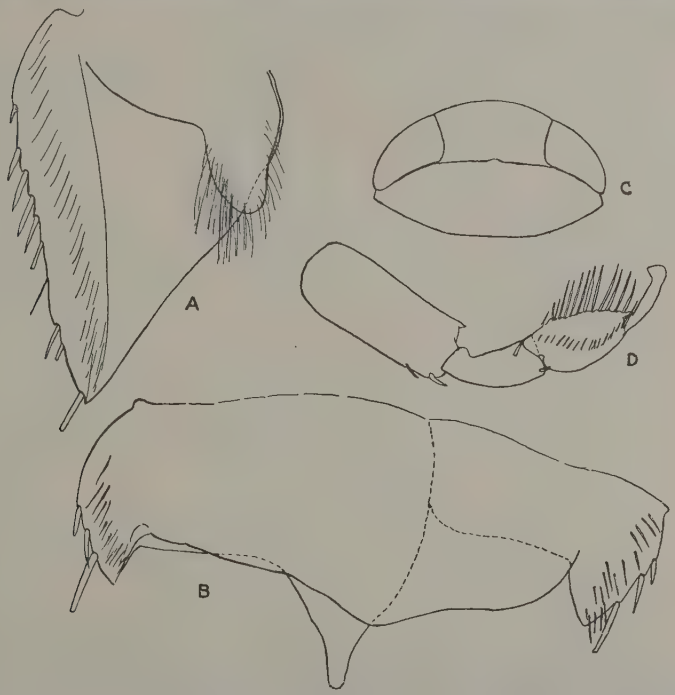

Fig. 1.—*Micronecta eupompe*, Hutch. Kampala, Uganda. (*a*) Left half of 8th abdominal tergite of ♂; (*b*) 8th abdominal segment of ♂; (*c*) head and pronotum; (*d*) anterior leg of ♂.

of Kampala. An interesting general account of the ecological conditions in Northern Bugishu has been published by Hancock and Soundy (1929 (1931), *J. E. Afr. Uganda Nat. Hist. Soc.*, **36 :** 165).

In spite of the intensive collecting that Messrs. Hancock and Hopkins have carried out in the past few years, the Corixid fauna of Uganda appears to be a meagre one. From the country around Kampala the only species known are the three recorded below and *Sigara* (*S.*) *chinana* (Hutch.), described in a previous paper (Hutchinson, 1928, *Ann. Mag. Nat. Hist.*, (10) **1 :** 305). The occurrence of *Micronecta piccanin* in Northern Bugishu, the hill country

on the north-western side of Mount Elgon, adds a fifth species to the list of Corixidae definitely known from Uganda. *Micronecta denticulata*, Hutch., recorded from the Kenyan shore of Lake Victoria will probably be found in Uganda, and the same is doubtless true of *M. scutellaris* (Stål), and *M. druryana*, Hutch., from Malagi Port * on Lake Albert, just over the border of the Belgian Congo. Even with these additions, the number of Corixidae inhabiting this part of Africa (8) is small compared with that in Abyssinia (15), and in striking contrast to the wealth of Notonectidae which Messrs. Hancock and Hopkins have brought to light.

Micronectinae.

1. *Micronecta eupompe*, Hutch.

Micronecta eupompe, Hutchinson, 1930, Proc. Zool. Soc. **1930** : 455.

The type and hitherto only known specimen of this species is a ♂ in poor

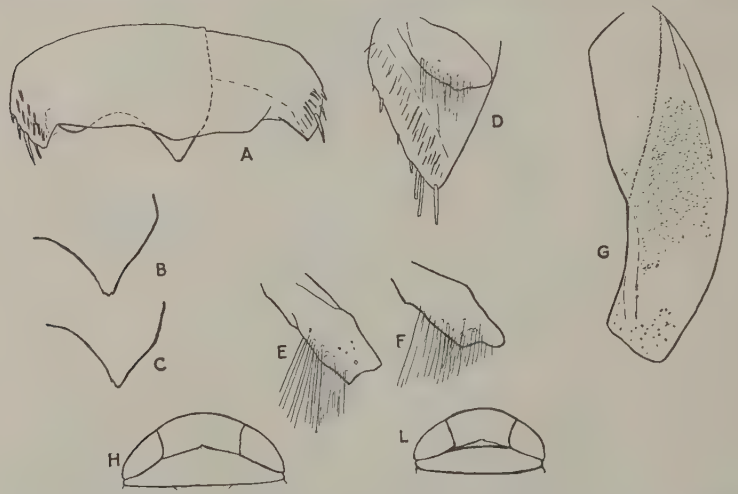

Fig. 2.—*Micronecta piccanin*, Hutch. (*a*) 7th abdominal segment of ♂ of f. *pardina*, Hutch., Nachtwaagd, Bredasdorp dist. Cape of Good Hope (*L. M. Starke* coll.); (*b*) submedian process of 7th abdominal sternite of ♂ of f. *piccanin*, Bulago, Uganda; (*c*) the same, type of f. *nebulosa*, Bulago; (*d*) left half of 8th abdominal segment of ♂, f. *pardina*; (*e*) free portion of same, f. *piccanin*, Bulago; (*f*) the same, f. *nebulosa*, type; (*g*) left elytron, f. *nebulosa*, type; (*h*) head and pronotum, f. *nebulosa*, type; (*l*) the same, f. *pardina*.

condition taken by Mr. J. Omer-Cooper in a water-hole near Lake Zwai in Abyssinia. The present specimens enable an emended description to be given.

Head very slightly shorter than pronotum, vertex evenly rounded in front, median elevation on posterior margin of head slight (fig. 1, *c*). Vertex in some specimens with an indistinct longitudinal orange stripe. *Pronotum* about as wide as head, from rather over three to three and a half times as wide as long; lateral margins distinct but very short, about $\frac{1}{4}$ of median length and just under $\frac{1}{4}$ the length of the posterior margin of the

* Erroneously stated to be in Uganda in a previous paper (Hutchinson, 1930, *Ann. Mag. Nat. Hist.*, (10) **6** : 57).

eye; posterior margin slightly flattened centrally. Sub-costal fossa reaching beyond apex of metapleura.

♂. Claw of pala narrow, dilated apically (fig. 1, *d*). Submedian process of 7th abdominal tergite elongate, denticulate apically (fig. 1, *b*).

♀. Slightly larger than ♂.

Length, ♂, 2·5–3·0 mm.; ♀, 3·0–3·5 mm.

Uganda: Kampala, numerous specimens from a water-hole and old brick pits, vii–xii.1929 (*G. H. E. Hopkins*).

In other characters the new material is in essential agreement with the type. *M. eupompe* is the only species of its genus known from Kampala,

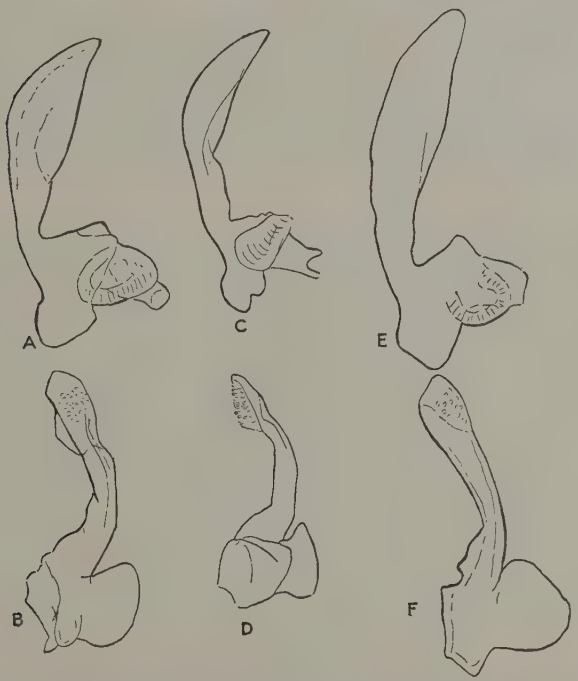

Fig. 3.—*Micronecta piccanin*, Hutch., parameres of ♂. (*a*, *b*) f. *piccanin*, Bulago; (*c*, *d*) f. *pardina*, Nachtwaagd; (*e*, *f*) f. *nebulosa*, type, Bulago.

where it appears to be common in small bodies of standing water. It is possible that if other types of habitat were explored, other species would be found.

2. *Micronecta piccanin*, Hutch.

Micronecta piccanin, Hutchinson, 1929, Ann. S. Afr. Mus., **25** : 440.
M. piccanin form *piccanin*, Hutchinson, 1929, *loc. cit.*, p. 441.

Uganda: Northern Bugishu, lower part (6500–7100 ft.) of north-western slopes of Mount Elgon (Masaba); Buginyanya 15.viii.1929, Bulago 14, 17.viii.1929, Butandiga 13.viii.1929 (*G. L. R. Hancock*).

M. piccanin, form **nebulosa,** n.

Pronotum greyish-brown as in f. *piccanin*, clavus very slightly darkened at the extreme apex, corio-claval suture blackish, corium with a very large black discal suffusion which extends back internally to the membrane, apex of membrane black (fig. 2, *g*).

Uganda: Northern Bugishu; Bulago 14.viii.1929 (forma brachyptera 1 ♂, type, 13 ♀♀ allotype and paratypes), Bulago, swampy stream 13.viii.1929 (forma macroptera 2 ♀♀, morphotype and paramorphotype) (*G. L. R. Hancock*).

This form is distinguished from the typical f. *piccanin* by the large black suffusion on the corium, and from the South African forms with corial markings by its practically unmarked clavus.

Only one ♂ was present in the series of 16 specimens collected by Mr. Hancock, and the parameres of this specimen do not differ from those of other individuals of the species enough to justify specific rank for *nebulosa*. The free portion of the 8th abdominal tergite has, however, a well-defined outer angle, unlike the typical condition of *M. piccanin* though similar to that usually found in the genus (fig. 2, *d–f*). Since no other structural characters separate the two forms, it is probable that the type of *nebulosa* is aberrant in this respect.

Micronecta piccanin is clearly very close to *M. dimidiata*, Poiss., from Kamerun (Poisson, 1928, *Bull. Soc. ent. Fr.*, **1928**: 75; 1929, *Contr. Faun. Cameroun, Faun. Colon. fr.*, **3**: 150). The most important distinction between the two species would appear to lie in the shape of the head, which is far more produced in the latter species as figured by Poisson than in *piccanin* (fig. 2, *h, l*). The sub-costal fossa is shorter in *piccanin* than in any other Ethiopian species known to me, but in *dimidiata* it seems to be still more abbreviated. The parameres of *dimidiata* are comparable to those of *piccanin*, but an exact evaluation of any distinctions is difficult owing to differences in the degree of expansion of the more membranous parts and the ease with which the apex becomes twisted in this species. In both species there appears to be a lamellated appendix at the base of the left paramere, and in both the apex of the right paramere is flat and papillate. Since the drawings of these structures of *M. piccanin* given previously were not satisfactory it has been thought best to figure the parameres of the specimens under consideration (fig. 3, *a–c*). The submedian prolongation of the 7th abdominal sternite, which has considerable taxonomic value in this genus, is subequilateral (fig. 2, *a–c*).

Corixinae.

3. *Sigara* (*S.*) *pectoralis* (Fieb.).

Corisa pectoralis, Fieber, 1851, Abh. böhm. Ges. Wiss. **5**: 57. (*vide* Hutchinson, 1929, Ann. S. Afr. Mus. **25**: 451).
Arctocorisa sjöstedti, Kirkaldy, 1910, Gerridae, Corixidae and Notonectidae, Sjöstedt, Wiss. Ergebn. Schwed. Exp. Kilimandjaro, **2**.
Sigara (*S.*) *sjöstedti*, Hutchinson, 1929, Ann. S. Afr. Mus. **25**.

Uganda: Kampala, Nambadzidza 16, 30.xi.1929, Kampala, water-hole and brick pits 18–19.ii.1930, Namaba 28.vii.1929 (*G. H. E. Hopkins*).

4. *Agraptocorixa dakarica*, Jacz.

Agraptocorixa dakarica, Jaczewski, 1926, Ann. zool. Mus. polon. **5**: 100.

Uganda: Kampala, old brick pit 17.x.1929, water-hole 18.ii.1930 (*G. H. E. Hopkins*).

EARLY STAGES OF NEW ZEALAND BUPRESTIDAE (COLEOPTERA)

By L. J. Dumbleton

(*Cawthron Institute, Nelson, N.Z.*)

The family Buprestidae is represented in New Zealand by only two indigenous species. The New Zealand species were originally placed in the genus *Buprestis*, but Kerremans (3) transferred *B. eremita*, White, to *Neocuris*, and *B. enysii*, Sharp, to *Nascioides*. The other species of both these genera are recorded from Australia, and both run to the appropriate genera in the keys to the Australian Buprestidae in a recent paper by Carter (2).

Nascioides enysii, Sharp.

Buprestis enysii, Sharp, 1877, Ent. Mon. Mag., **13** : 193.
Nascio enysii, Hutton, 1903, Index Faunae N.Z., 153.
Nascioides enysii, Kerremans, 1903, Wytsman, Gen. Insect., **12** : 147.

Adult (fig. 1). Form elongate, tapering posteriorly, dark green, submetallic.

Head transverse, as wide as anterior pronotum, closely punctate, with sparse short

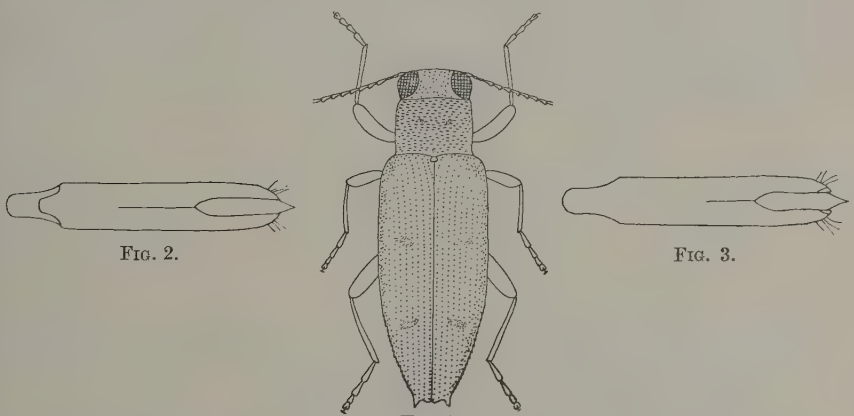

Fig. 2.

Fig. 3.

Fig. 1.

Fig. 1, *N. enysii*, Adult, dorsal view: fig. 2, do., male genitalia, dorsal view: fig. 3, do., do., ventral view.

hairs. Eyes ovoid, interior margins diverging anteriorly, widely separated above. Front slightly convex, narrower at top, faint median line on vertex. Antennal cavities with a blunt tubercle above; situated some distance from the margin of the eyes. Antennae slender, basal joint clavate, as long as 2 + 3; joints 4–10 serrate, longer than wide, pore cavity terminal. Epistoma arcuately emarginate with an arcuate carina behind the margin and below the antennal cavities; labrum transverse, truncate; mentum transverse, truncate anteriorly. *Pronotum* wider than long, subquadrate, sides narrowed in front, feebly rounded, constricted before base, posterior angles subacute; anterior margin truncate or very slightly sinuate, posterior margin slightly sinuate, median lobe not pronounced; lateral carina not developed anteriorly; surface rugose, with transverse depressions, bearing two oblique foveae at mid length, one anterior to the scutellum in the median line and one in each posterior angle; hairs sparse or absent; scutellum subtrapezoidal, wider posteriorly, concave. *Elytra* wider than pronotum at base, slightly sinuate to mid-length, thence tapering to apex which is excised, with an acute tooth externally and a

more obtuse internal tooth; apical half of margin serrate; surface with sparse short hairs, striate, third interstice more prominent; bearing two transverse yellow spots, one at one-third and one at two-thirds length. Femora fusiform, unarmed; tibiae slender, with two short apical spines; first joint of hind tarsi shorter than 2 + 3. *Prosternum* punctate except a narrow band below the lateral carina, and with dense white hairs, anterior margin straight; process broad, apex rounded; sternal cavity reaching posteriorly to metanotum; metasternal epimera visible; mesosternum and metasternum punctate, with dense white hairs. *Abdomen* ventrally punctate, bearing dense white hairs; pygidium rounded, not exposed by elytra. Male with last abdominal sternite arcuately excised; genitalia (figs. 2, 3) with sides of lateral lobes subparallel, bearing 4–6 long hairs near apex; median lobe acuminate. Female with last abdominal sternite rounded.

Length, 6·5–10 mm. *Width*, 1·7–3·2 mm.

Distribution. North and South Islands of N.Z.

Food-plant. New Zealand beech (*Nothofagus* spp.).

Pupa (fig. 13, see p. 44). General characters of the adult; no spines or distinctive armature.

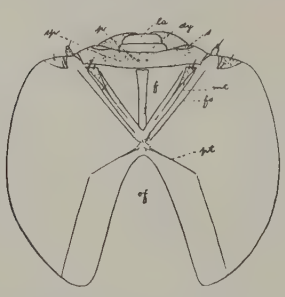

Fig. 4

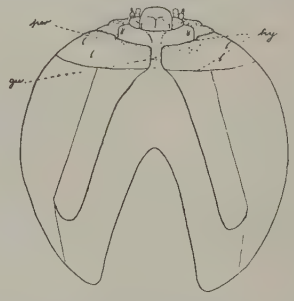

Fig. 5.

Fig. 4, *N. enysii*. Head of larva, dorsal face; *cly*, clypeus; *ep*, epistoma; *f*, frons; *fs*, frontal suture; *la*, labrum; *of*, occipital foramen; *p*, epistomal pit; *mt*, marginal thickening; *pt*, posterior thickening; *s*, sulcus of epistoma: fig. 5, head of larva, ventral face; *gu*, gula; *hy*, hypostoma; *per*, peristoma.

Larva. Colour dull creamy white; length 19–22 mm.; body sparsely clad with fine light-coloured hairs. *Head* (figs. 4, 5) cordate, deeply emarginate posteriorly and retracted into prothorax as far as posterior margin of epistoma; frons triangular, unpigmented, reaching posteriorly to occipital foramen; a band-like lateral thickening anterior, and parallel to frontal suture on each side, extending from posterior angle of epistoma to the median line in the posterior angle of frons, and heavily chitinised at anterior end, where it bears a short and a long seta; a third seta present on the band posterior to this; a median band extends from posterior margin of epistoma to posterior angle of frons; posterior thickening bar arising from posterior angle of frons and extending in a lateral and posterior direction to the posterior margin of the epicranium. Head capsule invaginated ventrally as far as gula; internal margins not thickened; a longitudinal thickening, angled posteriorly, runs from angle of hypostoma to posterior angle of head. *Antennae* (fig. 8) three-jointed, with an unpigmented basal membrane; first joint chitinised, cylindrical, distally setose and with a single sensory pore; second small subglobose with a single long subdistal seta; third minute; conical, retractile into cup-like apex of second joint. Epistoma heavily chitinised, with a short curved sulcus between clypeus and antenna, while close to median line on each side is a small pit containing two minute peg-like sensillae, and anterior to

these a small sensory pore. Clypeus transverse, four times as wide as long, membranous, unpigmented. *Labrum* (fig. 6) transverse, anterior angles rounded and anterior margin ciliate, bearing six well-developed setae on each side, two on lateral margin, two submarginal, and two on anterior margin; a darker pigmented spot laterad of base of anterior

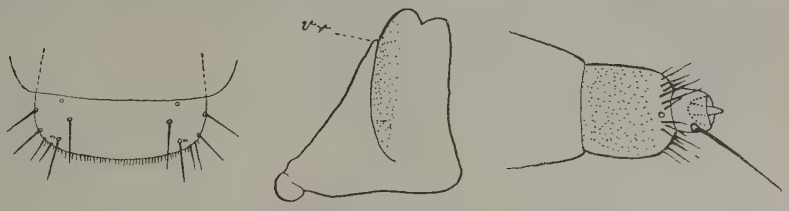

Fig. 6. Fig. 7. Fig. 8.

Fig. 6, *N. enysii*. Labrum of larva: fig. 7, mandible of larva, buccal view; *vr*, ventral retinaculum: fig. 8, antenna of larva.

submarginal seta; two sensory pores anterior to margin of clypeus. Mandible (fig. 7) apically bi-dentate with a small tooth or retinaculum on ventral margin below apex; buccal surface concave. Peristoma heavily chitinised, anteriorly bearing a single short seta in the angle posterior to antenna, one laterad of antenna and two on the ventral surface; not defined ventrally from hypostoma; ocelli absent. Hypostoma heavily chitinised

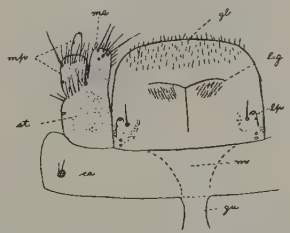

Fig. 9.—*N. enysii*. Ventral mouth-parts of larva; *ca*, cardo; *gl*, glossa; *gu*, gula; *lig*, ligula; *lp*, labial palp; *ma*, mala; *mp*, maxillary palp; *st*, stipes.

anteriorly. Ventral mouth-parts (fig. 9) protracted; cardo unpigmented, not distinctly separated from mentum, a small subcircular chitinised plate bearing two setae and a sensory pore situated near posterior angle; maxillary articulating sclerite absent; stipes chitinised, distally setose below the two-jointed maxillary palp and with a sensory pore at mid-length on outer margin; first joint of palpus chitinised, with a distal

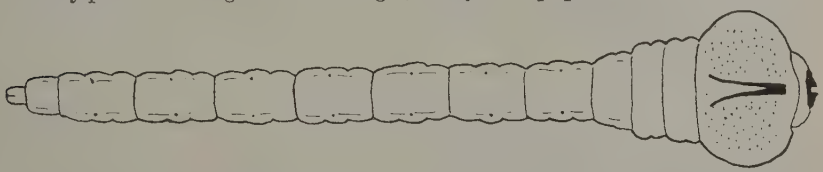

Fig. 10.—*N. enysii*. Larva, dorsal view.

fringe of setae and sensory pore on outer margin, the second joint shorter and narrower with a number of apical sensillae and a sensory pore at mid-length; mala borne on stipes, subcylindrical, chitinised, obliquely rounded and setose distally, with a single subdistal sensory pore; gula narrow, longitudinal, lighter in colour than hypostoma, with a darker

median line; mentum obconical, unpigmented and ill-defined; labium (fig. 9) subquadrate, wider than long, anterior angles rounded, finely setose on anterior third, at mid-length with obscurely bi-lobed, setose, ligula, the posterior angles chitinised and bearing two sensory pores, and anterior to these a vestigial labial palp with an apical sensory pore, a subapical pore, and a single seta mesad of the palp. *Thorax.* Prothorax large, dorso-ventrally flattened, wider than following segments, transverse, subcordate; dorsal and ventral plates ovoid, not sharply delimited, densely set with chitinous asperities; dorsal plate (fig. 10) divided by two smooth para-median grooves bounded by darker chitinisation and forming an inverted V; ventral plate (fig. 11) with a simple, smooth, lanceolate, median groove, set in an I-shaped chitinisation. Mesothorax much narrower than prothorax, laterally divided into two lobes by a vertical groove; spiracle on anterior lobe. Metathorax slightly narrower than mesothorax. Circular leg rudiments (fig. 11) present on pedal lobes, near posterior angles of the thoracic sterna. Ill-defined scansorial areas with chitinous asperities on dorsal and ventral surfaces of meso- and metathorax. *Abdomen.* First segment longer and narrower than metathorax, shorter than following segments;

Fig. 11.

Fig. 12.

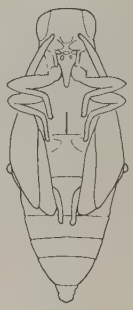

Fig. 13.

Fig. 11, *N. enysii.* Larva, ventral view showing leg rudiments: fig. 12, mesothoracic spiracular plate of larva: fig. 13, pupa, ventral view.

spiracle on pleuron. Segments two to eight approximately equal in length, decreasing slightly in width; epipleural folds well developed; spiracles present anterior to mid-length on lateral margins of terga; spiracle on 8 larger than preceding; segment 9 half as long as 8, narrower, epipleural fold developed; segment 10 shorter and narrower than 9, divided posteriorly into two lateral lobes by a vertical anal cleft. No definite ampulae present, but ill-defined scansorial areas with chitinous asperities are present on dorsal and ventral surfaces of segments 1 to 9.

Spiracular plates elongate reniform; mesothoracic (fig. 12) twice as large as abdominal, with about twenty chitinous cross-bars; abdominal with about ten cross-bars.

Neocuris eremita, White.

Buprestis eremita, White, 1846, Voy. Erebus & Terror, Insects, 6.
Nascio eremita, Hutton, 1903, Index Faunae N.Z., 153.
Neocuris eremita, Kerremans, 1903, Wytsman, Gen. Insect., **12** : 179.

Adult (fig. 14). Form small, elongate oval, slightly flattened above, black, submetallic.

Head transverse, narrower than pronotum, closely punctate, with moderately dense short white hairs. Eyes ovoid, interior margins diverging anteriorly, widely separated above. Front slightly convex, narrower at top, faint median line on vertex; a carina

runs across the front from above the antennal cavities which are a small distance from the margin of the eye. Antennae slender, joints 4–10 serrate, longer than wide, pores terminal. Epistoma arcuately emarginate; labrum transverse, truncate; mentum wider than long, subtriangular. *Pronotum* nearly twice as wide as long, narrowest in front, sides feebly arcuately rounded, slightly constricted before base, posterior angles rectangular; anterior margin feebly bisinuate; base feebly sinuate, median lobe well developed; lateral carina well developed, surface closely punctate and with moderately dense short white hairs; scutellum subtriangular, wider anteriorly, impunctate. *Elytra* wider than pronotum at base, slightly wider behind middle than at base, sides between base and middle subparallel, apices separately rounded, finely toothed on margin and

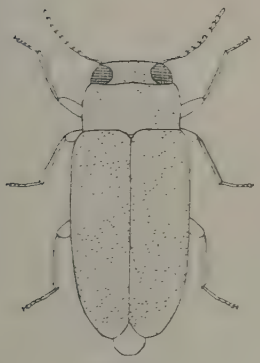

Fig. 14.

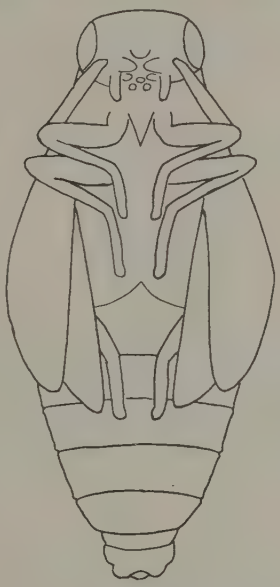

Fig. 17.

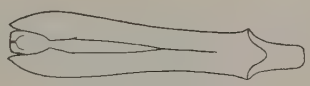

Fig. 15.

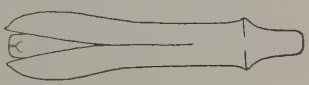

Fig. 16.

Fig. 14, *N. eremita*. Adult: fig. 15, male genitalia, dorsal view: fig. 16, do., ventral view: fig. 17, pupa, ventral view.

exposing the broadly rounded pygidium; surface closely punctate, with moderately dense short white hairs. Femora fusiform, unarmed; tibiae slender, fore and hind tibiae each with single small apical spine, the middle tibiae with 2 spines; first joint of hind tarsi as long as the three following joints. *Prosternum*, closely punctate and with moderately dense white hairs, anterior margin straight, prosternal process acuminate. Sternal cavity entirely formed by mesosternum, not reaching posteriorly to metasternum. Metathoracic epimera not exposed. *Abdomen* closely punctate ventrally and with moderately dense short white hairs, last sternite broadly rounded. Male genitalia (figs. 15, 16) with sides of lateral lobes subparallel on basal half, arcuately expanded on distal half, glabrous; median lobe subtruncate. There are no external differences between the males and females.

Length, 4·2–5·4 mm. *Width*, 1·7–2·1 mm.

Distribution. North and South Islands of New Zealand.
Food-plant. Elm (*Ulmus campestris*); native food-plant unknown.

Pupa (fig. 17). General characters of adult; no spines or distinctive armature of any sort. *Larva*. Colour white, length 14 mm.; body sparsely clothed with fine light-coloured hairs. *Head* (figs. 18, 19) cordate, deeply and more widely emarginate posteriorly than in *N. enysii*, retracted into prothorax. Frons triangular, unpigmented, reaching posteriorly

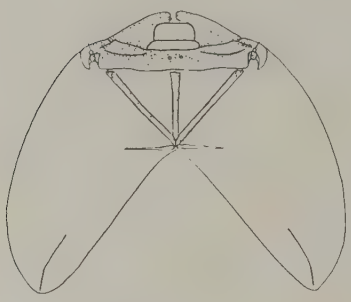

Fig. 18.

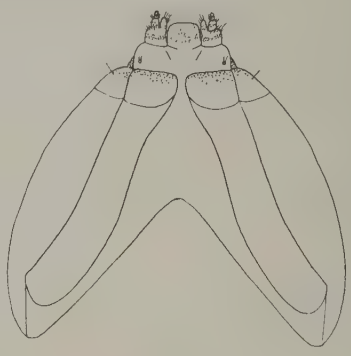

Fig. 19.

Fig. 18, *N. eremita*. Head of larva, dorsal view: fig. 19, do., ventral view.

to occipital foramen; lateral thickening bands with three small setae anteriorly; median band as in *N. enysii*; posterior thickening reduced to short transverse bar extending into epicranium from posterior angle of frons. Ventral invagination of head and thickening as in *N. enysii*. *Antennae* (fig. 20) three-jointed with an unpigmented basal membrane; first joint chitinised cylindrical, distally with a fringe of short setae and a single sensory pore; second beset with short setae and with a single well-developed subdistal seta; third, minute, conical retractile into apex of second. *Epistoma* heavily chitinised, sulci present,

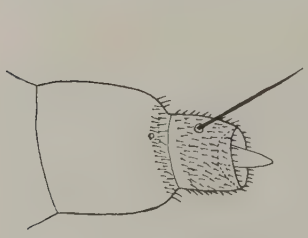

Fig. 20.

Fig. 21.

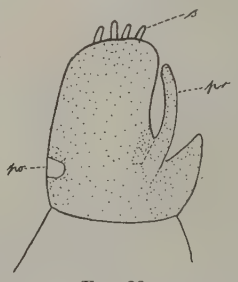

Fig. 22.

Fig. 20, *N. eremita*. Antenna of larva: fig. 21, mandible of larva, buccal view; *dr*, dorsal retinaculum; *vr*, ventral retinaculum: fig. 22, maxillary palpus of larva, distal joint; *po*, sensory pore; *pr*, chitinous process; *s*, sensillae.

para-median pits containing two small sensillae with a small sensory pore anterior to these; clypeus transverse, unpigmented; labrum subquadrate, anterior angles rounded; six well-developed setae on each side, pigmented spot and sensory pores as in *N. enysii*. Mandible (fig. 21) apically bidentate with dorsal and ventral retinacula well-developed,

buccal face very concave; hypostoma lightly chitinised. Ventral mouth-parts protracted; cardo unpigmented, not distinctly separated from mentum, with subcircular chitinised plate bearing two setae and a sensory pore situated near posterior angle; maxillary articulating sclerite absent; stipes chitinised, with distal fringe of setae, and sensory pore at mid-length; first joint of palpus chitinised, with distal fringe of setae and single sensory pore at mid-length, the second joint (fig. 22) shorter with stout chitinous process arising from internal margin of the enlarged base, sensory pore on outer margin, and apical sensillae; mala borne on stipes, tapering, chitinised, obliquely rounded and setose distally. Gula lighter in colour, narrow, longitudinal; mentum ill-defined; labium (fig. 23) quadrate, lobes of ligula not developed, surface setose nearly to posterior margin, setose area constricted at mid-length; posterior angles chitinised bearing two sensory pores, palp vestigial, with an apical sensory pore, a subapical pore, and a single seta mesad of the palpus. *Thorax.* Prothorax large, dorso-ventrally flattened, wider than the following segments,

FIG. 23.

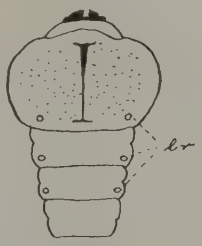

FIG. 25.

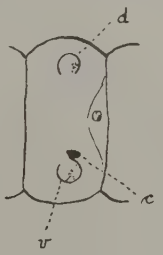

FIG. 26.

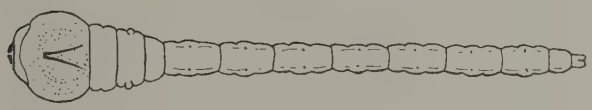

FIG. 24.

Fig. 23, *N. eremita.* Labium of larva: fig. 24, larva, dorsal view: fig. 25, larva, ventral view; *lr*, leg rudiments: fig. 26, metathorax of larva, lateral view; *c*, chitinous spot; *d*, dorsal ambulatory tubercle; *v*, ventral tubercle.

transverse, subcordate; dorsal and ventral plates subcircular, well defined; set with chitinous asperities; dorsal plate (fig. 24) divided by two smooth para-median grooves forming an inverted V; ventral plate (fig. 25) divided by smooth median groove bifurcated at two-thirds length forming an inverted Y. Mesothorax narrower, laterally divided into two lobes; spiracle on anterior lobe. Metathorax (fig. 26) with distinct, rounded, dorsal and ventral ambulatory tubercles; triangular chitinised spot on pleuron dorsad of ventral tubercle; laterally divided into two lobes by vertical groove. Leg rudiments absent. Ill-defined scansorial areas on dorsal and ventral surfaces of meso- and metathorax. *Abdomen.* First segment wider anteriorly, shorter than following; spiracle at mid-length on pleural membrane; segments two to eight twice as long as wide; spiracles at mid-length on lateral margins of terga; epipleural folds developed on segments two to nine, the latter as wide as long; ten wider than long, half length of nine, divided by vertical anal cleft into two lateral lobes. Dorsal and ventral surfaces of segments one to nine with ill-defined scansorial areas beset with chitinous asperities. *Spiracular plates*; mesothoracic reniform, with about ten chitinous cross-bars; abdominal plates ovoid or subcircular with four or five cross-bars; eighth reniform, twice as large.

The larvae of the two above described species are readily identified by the following characters :—

Ventral prothoracic plate with undivided groove; leg rudiments present; metathorax without ambulatory tubercles and chitinised spot; second joint of antenna glabrous; distal joint of maxillary palpus without process; ligula developed; mandible with ventral retinaculum only . . . *Nascioides enysii.*

Ventral prothoracic plate with bifurcated groove forming an inverted **Y**; leg rudiments absent; metathorax with ambulatory tubercles and chitinised spot; second joint of antenna setose; distal joint of maxillary palpus with chitinous process; ligula not developed; mandible with dorsal and ventral retinacula . . . . . *Neocuris eremita.*

The nomenclature of larval structures in this paper follows that of Böving (1), and the descriptions are based on the mature larvae.

Biology.

Little is known of the habits of the two species, especially with regard to the length of the larval period, and the oviposition habits of the adults.

Nascioides enysii. Larvae were taken in September, 1930, boring between the bark and wood of dead mountain beech, at an elevation of 4000 ft. on Mt. Ruapehu. These pupated and adults emerged early in November. The pupal cell was constructed in the solid wood, but under natural conditions the pupal cell is probably constructed between the bark and the wood, unless the bark is too thin or too dry.

Miller (4) mentions a Buprestid larva which was probably the above species, as causing the death of mountain beech at Pokaka, but the extent of the injury to the native beech forests by this species is not known.

The adult insect has been collected from both Islands, and its distribution probably coincides with that of the genus *Nothofagus*, as it has not been recorded from any other tree.

A Braconid parasite of the larvae was reared from cocoons taken from the larval burrows and identified by Mr. E. S. Gourlay as *Doryctes pallida*, Gourlay.

Neocuris eremita. Larvae, pupae, and adults were taken from dead branches of elm in Nelson, early in December, 1930. The young larvae construct broad shallow mines between the bark and the wood, later entering the wood and constructing flattened oval burrows. Pupation occurs at the end of this burrow near the surface, and the adult cuts a small oval exit hole through the bark. The adults, which are active flyers, were emerging up till early January. The species has been collected in both Islands, but at present the native food-plants are not known.

Large numbers of a Braconid parasite of the larvae were reared from this material. Mr. Gourlay states that it is an undescribed native species.

The writer is much indebted to Dr. D. Miller for criticism and advice during the preparation of this paper.

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(1) Burke, H. E., & Böving, A. G., 1929, The Pacific Flathead Borer. Tech. Bull. U.S. Dept. Agric., **83**.
(2) Carter, H. J., 1929, Check List of the Australian Buprestidae. Austr. Zool., **5**.
(3) Kerremans, C., 1903, Buprestidae. Wytsman, Genera Insectorum, **12**.
(4) Miller, D., 1925, Forest and Timber Insects in New Zealand. N.Z. Forest Service Bull., **2**.

SOME APHIDAE OF SOUTHERN RHODESIA WITH DESCRIPTIONS OF FIVE APPARENTLY NEW SPECIES

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The family Aphidae appears to have received but scant attention in South Africa, and practically nothing is known of the species occurring in Southern Rhodesia. The late Prof. F. V. Theobald recorded and described many species from various parts of Central and South Africa in his papers on African Aphids (*Bull. Ent. Res.*, **4, 6, 8** and **11**), some of which have already been found in this country.

The present paper deals with a few species (28) that have been collected in the past four years; these include what is believed to be a new genus and five new species. There can be no doubt that the family is extremely well represented in Southern Rhodesia, but unfortunately time does not permit of specialised collecting or it is probable that many more species would have been found.

All types and either material or slides will be deposited with the British Museum (Natural History) in due course. Cotypes of new species, wherever possible, will be given to the Department of Agriculture, Southern Rhodesia, and the Rhodesian Museum at Bulawayo.

The permission of the General Manager of the British South Africa Company in Southern Rhodesia to publish this article is gratefully acknowledged. Thanks are also due to Mr. F. Eyles, formerly Botanist to the Department of Agriculture, Southern Rhodesia, for very kindly identifying many food-plants, and to Mr. R. W. Jack and the other members of the Entomological staff for access to the collections and library of the Department. Some of the material here dealt with was referred to the late Prof. Theobald, whose remarks thereon were of the greatest value. Acknowledgement is made in the text where the material has not been collected by the author.

1. *Dilachnus thujafolia*, Theo.

Lachniella thujafolia, Theobald, 1914, Bull. Ent. Res., **4** : 335.
Dilachnus thujafolia, Hall, 1926, Notes on the Aphididae of Egypt. Min. Agric. Cairo, Bull., **68** : 3.

Found to be common on *Thuja* sp. (Coniferae) in the Municipal Gardens, Salisbury, in May and June 1928. Numerous apterae, but only one alate, were taken. The material was typical and agreed perfectly with specimens from elsewhere in the writer's collection.

2. *Pterochlorus saligna*, Gmelin.

Aphis saligna, Gmelin, 1788, Syst. Nat., 2209, No. 62.
Lachnus viminalis, Theobald, 1915, Bull. Ent. Res., **6** : 144.
Pterochlorus saligna, Theobald, 1929, Aphididae of Great Britain, **3** : 104.

Collected on *Salix capensis* and *Salix* sp. (Salicaceae) on the banks of the Mazoe River in August and October 1927. Both alatae and apterae of this cosmopolitan species were found.

Unipterus, gen. n.

Belonging to the subtribe Callipterina.

Head broader than long, eyes with ocular tubercles. Antennae of six segments, clothed with a few minute bristles and with oval sensoria set transversely on the segments; shorter than the body. Limbs relatively short, femora of median pair poorly developed. Fore-wings with media once branched; hind-wings with both media and cubitus present. Cornicles short and truncate. Anal plate very deeply divided, lobes apparently distinct. Cauda conspicuously knobbed. Body often with more or less conspicuous papillae.

Genotype : *Unipterus terminaliae*, sp. n.

3. **Unipterus terminaliae,** sp. n. (Fig. 1.)

Alate viviparous female.

Varying from brick-red to very dark in colour, the tip of the abdomen always being pale. Antennae about $\frac{2}{3}$ the length of the body, pale. Legs and cauda pale. Wing-venation pronounced. Proboscis extending as far as the mid coxae.

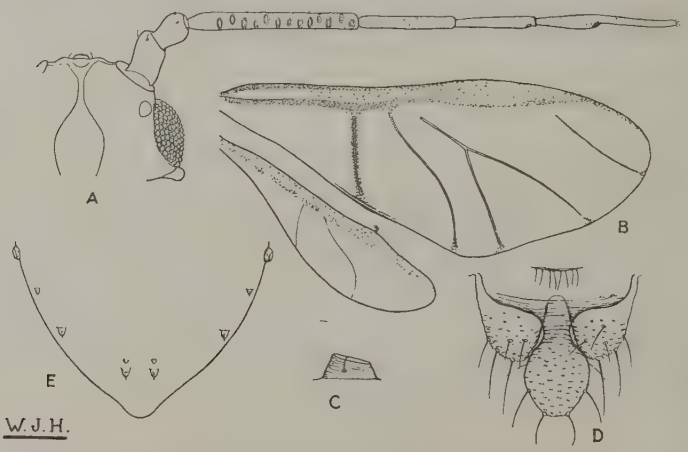


Fig. 1.—*Unipterus terminaliae*, sp. n.

Alate viviparous ♀: A, antenna and portion of head, × 96; B, wings, × 192; C, cornicle, × 192; D, cauda and anal plate, × 192. Nymph : E, posterior extremity of abdomen, × *c.* 60.

Antennae of six segments; segment I slightly longer than II; segment III with from 9–16 oval sensoria (average of a large number of examples 13) set more or less evenly along the whole length, one of these is frequently situated at the very tip; segment IV rather more than $\frac{1}{2}$ the length of III—in one example both antennae carried a single sensorium on this segment; segment V slightly shorter than IV and about $\frac{1}{2}$ the length of III—in a single case this segment carried a single sensorium near the middle in addition to the usual apical sensorium; segment VI about $\frac{4}{5}$ segment III, the flagellum being either equal to, or slightly longer than, the base. Segments IV–VI imbricated, III only shows the faintest imbrications. Legs comparatively short, median pair much the shortest and posterior pair the longest. Median femora relatively shorter than those of either the anterior or posterior pair. The femora of the anterior pair, although shorter, are much stouter than those of the posterior pair. Cornicles very short and truncate with a single

minute hair on one side; they are set unusually far forward from the tip of the abdomen. Anal plate conspicuously bilobed. Cauda knobbed, extending beyond the anal plate, with three lateral hairs on either side. A pair of very small papillae, each terminated by a minute spine, can usually be detected just behind the anal plate. Fore-wings with the media once branched; veins slightly clouded at their apices. Hind-wings with both media and cubitus present.

Length, 1·5 mm.

Nymph. Brick-red in colour; the colour is a little paler submarginally and darker marginally, the tip of the abdomen being pale it appears as though there is a large dark abdominal patch. Antennae and legs pale. Abdomen with a pair of papillae set close together near the tip and a smaller pair immediately anterior to these. Two similar papillae are found laterally, on each side, behind the cornicles, those nearer to the cornicles being the smaller. They also occur laterally in front of the cornicles, but are small and inconspicuous. Each papilla carries a minute spine apically.

Length, 1·5 mm.

Food-plant. *Terminalia sericea* (Combretaceae).

Locality. El Dorado, 14.xii.27.

Remarks. Described from numerous alates and nymphs.

This is a very characteristic species with its cornicles set so unusually far from the tip of the abdomen. It is obviously a Callipterine form, but the nature of its wing-venation and other characters would appear to preclude its inclusion in any of the genera of this subtribe known to the writer.

4. **Unipterus papillata,** sp. n. (Fig. 2.)

Alate viviparous female.

A very dark brown, almost black, species with a conspicuous transverse brown stripe on the fore-wing. The wings at rest are held horizontally over the body and this gives the appearance of a transverse dark bar on the abdomen. Abdomen a lighter brown than the rest of the insect, with a few dark brown transverse bands more particularly anteriorly. The entire insect is set with conspicuous white processes which are arranged as shown in the accompanying figure (fig. 2, A). They are delicate, imbricated, with a minute clubbed spine apically. Three pairs occur on the head, the first on the frons, the third about the same distance apart further back, whilst the median pair are widely separated being situated at the base of the antennae. On the thorax and abdomen they are arranged in pairs as shown, with the exception of four conspicuous processes which lie in a crescent shape on the thorax. The first two pairs on the abdomen, and sometimes the third, are usually joined by a black stripe; those on the abdomen get successively smaller towards the cauda. In front of the cornicles are four lateral rounded or conical processes on either side, these are conspicuous and heavily shaded, with the exception of the anterior one which is smaller than the others. There is a smaller and less conspicuous pair just behind the cornicles. These processes are covered with minute spines and carry the same minute clubbed spine apically that is found on the dorsal papillae.

Antennae, about $\frac{1}{2}$ as long as the body, of six segments of which I and II are dusky III to V whitish to pale brown, VI dark. Proboscis extending to the vicinity of the hind coxae. Legs a pale semitransparent straw colour throughout; in dark specimens there is a little dark brown coloration at the distal extremity of the femora of the hind pair. The legs are comparatively short; the femora of the anterior pair are slightly longer than those of the posterior pair and very much stouter. The median pair are similar to the posterior pair but much shorter. At the basal extremity of the hind femora is a group of usually three circular pores. Cauda very pale approaching white. The abdominal coloration varies from a sepia to a very dark brown, in the latter usually four transverse dark bands are discernible on the anterior abdominal segments. Fore-wings with media once

branched and a marked dusky area around the 3rd oblique vein. Hind-wings with both media and cubitus present.

Antennae with segment I longer and broader than II. Segment III with from 6–10 (usually 8) oval sensoria. Segment IV slightly less than $\frac{2}{3}$ the length of III, often with a single sensorium on its apical half. Segment V either the same length or more often slightly longer than IV. Segment VI slightly longer than V, the base occupying rather more than $\frac{1}{2}$ of the entire length. Segments III–VI imbricated. Cornicles short and truncate. Anal plate markedly bilobed, each lobe with 6–10 relatively long and stout setae. Cauda conspicuously knobbed with four lateral setae on either side; it extends well beyond the anal plate.

Length, 1·4–1·5 mm.

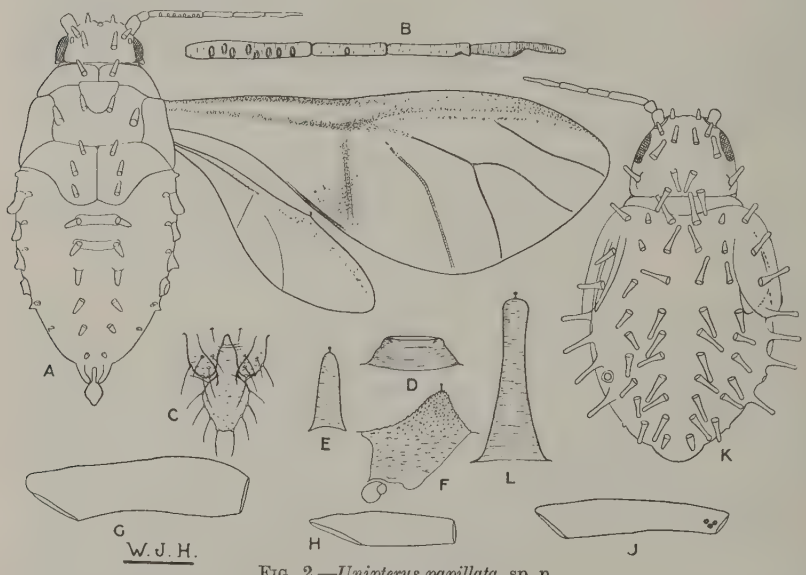


Fig. 2.—*Unipterus papillata*, sp. n.

Alate viviparous ♀: A, wings and arrangement of papillae, × 40; B, antenna, × 80; C, cauda and anal lobes, × 95; D, cornicle, × 190; E, papilla, × 190; F, lateral tubercle, × 190; G, H, and J, femora of anterior, median and posterior limbs respectively, × 80. Nymph: K, antennae and arrangement of papillae, × 40; L, a papilla, × 190.

Nymph. A pale reddish-brown so covered by long white processes that it resembles a hedgehog. These papillae are more numerous and longer than in the alate; they are shaped like an attenuated capstan or lighthouse, with a minute knobbed spine apically. On the thoracic and abdominal regions the papillae are arranged in six longitudinal rows set at more or less equal intervals. Apart from two on the frons the remaining twelve on the head are arranged in three crescents each consisting of four processes.

Length, 1·4 mm.

Food-plants. *Combretum apiculatum* and *C.* spp. (Combretaceae).

Locality. Mazoe, October 1927 and December 1928.

Remarks. Collected on four occasions at Mazoe, but no apterae were found. It will be noted from the description given above that the living insects in this case are very striking, and particularly is this true of the nymph which looks for all the world like a minute hedgehog.

The nature of the wing-venation and general characteristics suggest that it is congeneric with *Unipterus terminaliae*, and it has therefore been assigned to this new genus.

5. *Setaphis* sp.

On *Flueggea microcarpa* (Euphorbiaceae), El Dorado, 14.xii.27; Mazoe, 26.i.28 and 10.xii.28.

A little of this material was sent to the late Prof. F. V. Theobald, who replied that it was not his *Setaphis bougainvilleae* and that the wing-venation differed from that of *S. luteus*, Van d. Goot.

S. bougainvilleae was described (1920, *Bull. Ent. Res.*, **11**: 70) from apterae only, collected at Kampala in Uganda. The writer is quite unable to see any differences between the apterae of the Rhodesian species and the original description, and they agree very closely with a paratype slide of *bougainvilleae* ex coll. Theobald in the writer's collection.

Unfortunately neither the original description nor authentic material of Van der Goot's *luteus* has been available. The wing-venation and general characteristics of Rhodesian examples agree very well with the figures of *luteus* given in Baker's "Generic Classification of the Hemipterous family Aphididae" (1920, *Bull. U.S. Dept. Agric.*, **826**).

Under the circumstances, therefore, the identity of this very distinctive species must remain undetermined for the time being.

6. *Aphis gossypii*, Glover.

Glover, 1854, Rept. Patent Office, **62**, and 1855, **68**.
,, 1876, Rept. Agric. U.S.A., **36**.
Theobald, 1914, Bull. Ent. Res., **4**: 321.
,, 1927, Aphididae of Great Britain, **2**: 141.

This ubiquitous species has been collected on the following food-plants :—

Anacardiaceae .	*Mangifera indica*, Mazoe, 31.x.27 (*H. Purdon*).
Bignoniaceae .	*Jacaranda mimosaefolia*, Mazoe, 27.x.27.
Combretaceae .	*Combretum apiculatum*, Mazoe, 27.x.27 and 1.xi.27.
,, .	*Combretum*, sp., Mazoe, 25.ii.29.
Compositae . .	*Bidens pilosa*, Umtali, 7.ix.27.
Dipterocarpaceae	*Monotes glaber*, 27.i.29.
Leguminosae .	*Acacia* sp., Mazoe, 10.xi.27.
Moraceae . .	*Ficus capensis*, Mazoe, 23.iv.28.
Rutaceae . .	*Citrus aurantium*, Umtali, 7.ix.27, and Mazoe, 12.viii.28.

There is no doubt that this is an extremely common species in Southern Rhodesia and that the above list of food-plants only represents a very few of those that are attacked.

7. *Aphis laburni*, Kalt.

Aphis laburni, Kaltenbach, 1843, Monog. Pflanz., 85.
,, ,, Hall, 1926, Notes on the Aphididae of Egypt, Min. Agric. Cairo, Bull., **68**: 20.
,, *leguminosae*, Theo., ditto, p. 21.
,, *medicaginis*, Koch., ditto, p. 23.
,, *cistiella*, Theo., ditto, p. 14.
,, *laburni*, Theobald, 1927, Aphididae of Great Britain, **2**: 122.

On *Dolichos lupiniflorus*, Mazoe, 26.x.27, and *Phaseolus vulgaris*, Umtali, 8.vi.28, both of which belong to the Leguminosae. Some material on roses, Mazoe, 26.x.27 (*H. Purdon*), appeared to be typical of this species although the host-plant seems unusual.

The possible synonymy of this species was indicated by the writer in his "APHIDIDAE of Egypt." The views put forward in that publication were subsequently confirmed by Theobald in his "APHIDIDAE of Great Britain."

8. *Aphis maidis*, Fitch.

Fitch, 1855, Insects N.Y., **1** : 318.

On *Hordeum vulgare* (barley), Mazoe, 31.x.27; *Zea mays* (maize), Mazoe, 9.xi.27, 8.iii.29 (*H. H. Farquhar*), 19.ii.30 (*R. L. Anderson*); *Eleusine indica* (Rapoko grass), Embeza, 12.iii.28, and on an unknown grass at Mazoe, 14.ii.29.

9. *Aphis nerii*, Boyer.

Boyer, 1841, Ann. Soc. ent. Fr., **10** : 179–180.
Hall, 1926, Notes on the Aphididae of Egypt, Min. Agric., Cairo, Bull., **68** : 23.

On *Chlorocodon* sp. (Asclepiadaceae), Mazoe, 12.xi.27.

10. *Aphis rumicis*, Linn.

Linnaeus, 1758, Syst. Nat., Ed. 10, **1** : 451.
Theobald, 1927, Aphididae of Great Britain, **2** : 98.

Common on *Rumex* sp. (Polygonaceae) at Mazoe from August to October 1927.

11. *Aphis tavaresi*, Del G.

Del Guercio, 1908, Broteria, **7** : 143.
Theobald, 1914, Bull. Ent. Res., **4** : 323.

This species can be found at any time of the year on the three Citrus estates belonging to the British South Africa Company at Mazoe, Sinoia and Umtali. It is one of the major pests of *Citrus* in Southern Rhodesia attacking the blossom and young growth more particularly between July and September. Control is effected by spraying.

Typical *A. tavaresi*, Del G., has also been collected on *Toddalia asiatica* (Rutaceae) at Embeza, 10.ix.27; on *Ficus carica* (Moraceae), Mazoe, 22.xii.28, and on an undetermined plant belonging to the Celastraceae at Mazoe, 26.i.28 and 10.xii.28.

12. *Brevicoryne brassicae*, L.

Linnaeus, 1758, Syst. Nat., Ed. 10, **1** : 452.
Theobald, 1927, Aphididae of Great Britain, **2** : 45.

On *Brassica* sp. (Cruciferae), Mazoe, 23.ii.28.

13. **Hyalopterus peucedani,** sp. n. (Fig. 3.)

Alate viviparous female.

A dusky green with darker thoracic bosses and head; abdomen with dark green lateral areas and usually some rather large dark green spots on the dorsum, the latter when present are few in number and without definite arrangement. Antennae about $\frac{2}{3}$ the length of the body, dark with the exception of the bases of III, IV and V. Cauda pale. Cornicles dusky at the base and tip. Legs with tarsi, distal $\frac{1}{6}$ of tibiae and distal $\frac{1}{2}$ of femora dark. Proboscis extending as far as the mid coxae.

Antennae of six segments, the 1st being broader but no longer than the 2nd. Segment III with from 28–43 sensoria scattered over all but the extreme base; the average number of sensoria in 20 examples was 36. Segment IV about $\frac{3}{4}$ the length of III with 5–12 scattered sensoria; average number 9. Segment V about $\frac{4}{5}$ the length of IV with the usual apical sensorium. Segment VI subequal with III, the base being about $\frac{1}{3}$ the length of the flagellum. Segments III–VI imbricated. Cornicles short, about equal in

length to the 4th antennal segment, constricted at the apex but flared at the tip and usually a little swollen about the middle; very faintly imbricated at the base and apex. Cauda longer than the cornicles, constricted in the middle with three lateral hairs on each side.

Length, 1·5–1·75 mm.

Apterous viviparous female.

A dull pale green, mottled, with a few dark sage green spots on the abdomen. Antennae slightly less than ½ the length of the body, pale, with segment VI and the tips of III, IV and V dusky to dark. Cauda pale. Cornicles short, dusky at the tip. Legs pale with femora and tibiae dusky at the tips and tarsi dusky to dark. Proboscis extending as far as the median coxae.

Antennae of six segments, the 1st broader but no longer than the 2nd. Segment III a little more than twice the length of IV which is subequal to V. Segment VI a little longer than III with the base about ½ the length of the flagellum and slightly shorter than V. Segments III to VI imbricated. Cornicles short, stouter than in the alate, about $\frac{5}{7}$ the length of the 3rd antennal segment, variable in form but always constricted

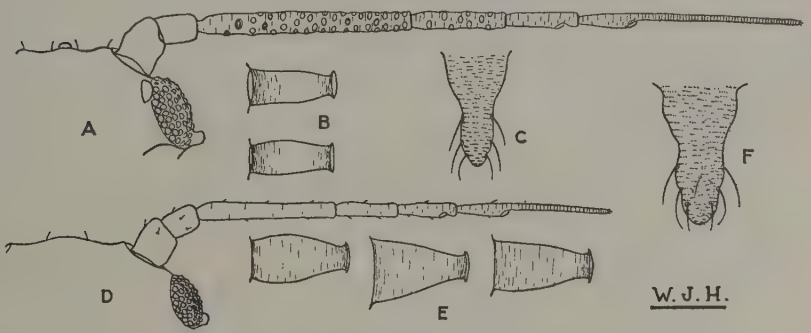


Fig. 3.—*Hyalopterus peucedani*, sp. n.

Alate viviparous ♀: A, part of head and antenna; B, cornicles; C, cauda. Apterous viviparous ♀ : D, part of head and antenna; E, cornicles; F, cauda. All magnifications × 95.

at the apex and flared at the tip; in some examples they are much broadened basally assuming a conical form, in others they are constricted basally but they are always broader at the base than the apex; imbrications faint except at base and apex. Cauda longer than the cornicles, about equal in length to the 3rd antennal segment, usually constricted about the middle and with two lateral hairs on either side and two in a subapical position. Dermis conspicuously reticulated.

Length, 1·75 mm.

Food-plant. *Peucedanum fraxinifolium* (Umbelliferae).

Localities. Umtali, 1.xii.27; Mazoe, 21.xii.27, 27.i.29 and 25.ii.29.

Remarks. The characters of this form are well marked and do not appear to coincide with any other species of the genus *Hyalopterus*.

14. *Toxoptera aurantii*, Boyer.

1. *Aphis aurantii*, Boyer, 1841, Ann. Soc. ent. Fr., **10** : 178.
2. *Toxoptera aurantii*, Koch, 1857, Pflanz. Aphid., 253.
3. *Aphis coffeae*, Nietner, 1880, The Coffee Tree and its enemies.
4. *Toxoptera aurantii*, Theobald, 1914, Bull. Ent. Res., **4** : 333.
5. ,, *coffeae*, ,, 1917, ,, ,, ,, 338.

6. *Toxoptera aurantii*, Swain, 1919, Synopsis of the Aphididae of California, Univ. Calif. Publ. Ent. Tech. Bull. **3** : 129.
7. *Toxoptera aurantii*, Baker, 1920, Generic classification of the Hemipterous family Aphididae Bull. U.S. Dept. Agric., **826** : 51.
8. *Toxoptera aurantii*, Takahashi, 1921, Aphididae of Formosa, **1** : 42.
9. ,, ,, Theobald, 1927, Aphididae of Great Britain, **2** : 319.

On *Maesa lanceolata* (Myrsinaceae), Embeza, 12.iii.28, and *Diospyros* sp. (Ebenaceae), Mazoe, 22.xi.29.

The synonymy suggested above is put forward tentatively; it may have been previously established, but no such reference has been seen.

Theobald (5) gives *Ceylonia theaecola*, Buckton, and *Toxoptera theobromae*, Schout., as synonyms of *T. coffeae*, Nietn. Baker (7) states that *theaecola*, Buckton, is a synonym of *T. aurantii*, Boyer. If these two authorities are correct, then it follows that *coffeae*, Nietn., must be a synonym of *aurantii*, Boyer. This is assuming that *T. aurantii*, Koch, is the same as *aurantii*, Boyer. Theobald (4) states they are not, but Swain (6), Baker (7) and Takahashi (8) are of the opposite opinion.

Slides in the writer's collection of *T. coffeae*, Nietn., from Dahomey, W. Africa, and of *T. aurantii*, Boyer, from Nairobi, Kenya, on *Citrus*, both ex coll. Theobald, show no differences on which the two species can be separated. The Rhodesian material agrees with both and has therefore been assigned to *aurantii*, Boyer.

The apterae of this species resemble those of *Aphis tavaresi*, Del G., and it is not always easy to separate the two in the absence of the alate form.

15. *Toxoptera graminum*, Rond.

Rondani, 1847, Nuov. Ann. Soc. nat. Bologna, (2), **8** : ix, and 1852, (3) **6** : (2) 9–12.
Theobald, 1927, Aphididae of Great Britain, **2** : 320.

On barley (*Hordeum vulgare*), Mazoe, 31.x.27.

16. **Yamataphis rhodesiensis,** sp. n. (Fig. 4.)

Alate viviparous female.

Head and thorax shiny black; abdomen dark brown, greenish-brown or plum coloured, darker at the tip. Antennae about $\frac{1}{2}$ the length of the body, black, bases of segments dusky. Cornicles and cauda black. Legs dusky at the joints. Proboscis extending to just beyond the hind coxae. Head without prominent antennal tubercles, but clothed with some moderately stout hairs. Eyes with conspicuous ocular tubercles.

Antennae of five segments, the 2nd segment being slightly longer but not so broad as the 1st; the 3rd segment with from 11–15 circular sensoria scattered over its length—average of a number of examples 13; segment IV about $\frac{5}{12}$ the length of III with an apical sensorium; segment V about twice as long as IV, the base being about $\frac{1}{3}$ the length of the flagellum. All segments imbricated. Cornicles about $\frac{2}{3}$ the length of the 3rd antennal segment, markedly constricted and flayed at the apex and often slightly swollen in the apical half. Cauda short and rounded, about $\frac{1}{3}$ the length of the cornicles with three stout inwardly curved hairs on each side; it does not extend beyond the anal plate. Fore-wings with media twice branched—in some specimens the 2nd fork is so close to the margin as to be hardly discernible—hind-wings with only the media present. Microscopic preparations show a large dusky area at the base of and behind the cornicles and two dark transverse bands between the cornicles and cauda. In front of the cornicles are three lateral dusky patches. Abdomen with transverse lines of hairs, each of which is usually set in a very small dark spot. There are two longitudinal submarginal rows of larger dark spots.

Length, 1·75–2 mm.

Apterous viviparous female.

Robust; head dark, thorax dusky, abdomen pale brown, brownish-green or plum coloured, dusky at the tip. Antennae short, only about $\frac{2}{5}$ the length of the body; I, II, V and the distal halves of III and IV dusky. Cornicles black with an area tinged with pink or plum around the base. Cauda not discernible. Legs dusky at the joints. Head without prominent tubercles but clothed with some moderately long and stout hairs. Ocular tubercles prominent.

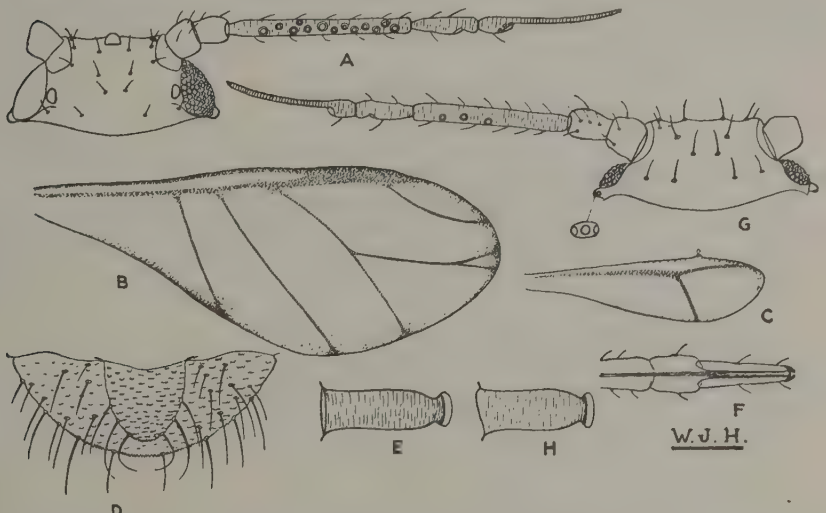


FIG. 4.—*Yamataphis rhodesiensis*, sp. n.

Alate viviparous ♀: A, head and antenna, × 95; B, fore-wing, × 30; C, hind-wing, × 30; D, cauda and anal plate, × 150; E, cornicle, × 75; F, the distal half of the proboscis, × 75. Apterous viviparous ♀: G, head and antenna, × 75; H, cornicle, × 75.

Antennae of 5 segments, the 2nd being slightly longer but not so broad as the 1st. Segment III with from 0-11 circular sensoria usually in the apical half—the average of a number of examples was 3. Segment IV about $\frac{2}{3}$ as long as III with an apical sensorium; segment V a little more than twice as long as IV with the base about $\frac{1}{3}$ the length of the flagellum. All segments imbricated. Cornicles similar to those of the alate, but tending to be a little shorter and stouter. Cauda and anal plate as in the alate. Body with scattered moderately long stout hairs, these are particularly noticeable on the head. Proboscis extending to just beyond the hind coxae. There are two prominent outwardly divergent processes between the mid coxae.

Length, 2 mm.

Food-plant. On the roots of an unknown plant.

Locality. Mazoe, 23.i.28 and 10.xii.28.

Remarks. Described from numerous alate and apterous specimens. It is a little doubtful if this species is correctly assigned to the genus *Yamataphis*, but it seems to come nearer to it than to any other. It differs from *Yamataphis* in the fact that the media of the fore-wings are twice branched, although the second fork is sometimes so close to the margin as to be hardly discernible, and that only the media is present in the hind-wings. The tip of the abdomen is strongly reminiscent of the genus *Anuraphis*.

17. *Amphorophora carduellinum*, Theo.

Rhopalosiphum carduellinum, Theobald, 1915, Bull. Ent. Res., **6** : 113.
,, ,, ,, 1920, ,, ,, ,, **11** : 67.

On thistles, Mazoe, 26.ii.29.

Rhodesian examples agree very closely with a paratype slide in the writer's collection. The number of sensoria on the antennal segments of the apterae is rather in excess of that quoted in the revised description given in the second reference, a number of examples show segment III with 17–28, segment IV with 4–12 and segment V with 0–5. In some instances the sensoria on the 4th and 5th segments are very small.

18. *Macrosiphum cissi*, Theo.

Theobald, 1920, Bull. Ent. Res., **11** : 65.

On *Rauwolfia inebrians* (Apocynaceae), Mazoe, 22.xi.27, and *Rhoicissus cuneifolia* (Vitaceae), Umtali, 10.vi.28.

Originally described from material taken on *Cissus* sp. (Vitaceae) at Pretoria, 18.x.18. As Prof. Theobald was dealing with spirit material without colour notes, the appearance of the living insects could not be given.

The individuals from the two food-plants upon which this species has been collected in Rhodesia differ rather considerably in colour.

Apterous viviparous female from Rauwolfia.

A uniform pale green. Cornicles long, black at the tip, shading off to pale green in the basal half. Cauda pale green. Antennae longer than the body, dark except for I, II and basal half of III. The segments get successively darker towards the tip. In some specimens the basal $\frac{1}{2}$ of IV and all but the tip of III is dusky. Legs with the tarsi and apical half of the tibiae dusky to dark at the tip.

Alate viviparous female from Rauwolfia.

Rather greener than the apterae, with brownish thoracic lobes. Cornicles with distal half black shading off to pale at the base. Cauda pale, concolorous with the tip of the abdomen. Antennae much the same as in the apterae. Legs with distal half of femora dark, tibiae dark, black at the tip and tarsi black.

Apterous viviparous female from Rhoicissus.

Pinkish-brown with a little pulverulent white matter chiefly intersegmentally. Cornicles and antennae black. Cauda pale like the tip of the abdomen. Legs as in the alate but the darkened areas are not so well marked.

Alate viviparous female from Rhoicissus.

Brown to dark brown, some specimens almost black. Cornicles dark, cauda brown and concolorous with the tip of the abdomen. A dark area around the base of the cornicles and three others in front situated laterally. Antennae dark except for the base of III. Legs with distal $\frac{1}{2}$ of femora and $\frac{2}{3}$ of tibiae black; tarsi black.

Microscopic preparations show that the individuals from *Rhoicissus* agree more closely with the original description of *cissi*, and paratype slides of this species in the writer's collection, than those from *Rauwolfia*, although the differences are of such a nature that they hardly warrant separation. The most significant difference is to be found in the appearance of the living insects from the two host-plants.

There can be no doubt that the material from *Rhoicissus* is the true *cissi*, but it must be admitted that there is a slight element of doubt as to whether it is correct to assign that from *Rauwolfia* to this species.

The late Prof. Theobald considered that the *Rauwolfia* material was his *cissi*, but he had not seen the living individuals from both food-plants, and it would admittedly be difficult to separate it from *cissi* on microscopic characters alone.

19. *Macrosiphum compositae*, Theo.

M. compositae, Theobald, 1915, Bull. Ent. Res., **6** : 106.
,, *dahliafolii*, Theobald, 1918, ,, ,, ,, **8** : 273.
,, *compositae*, Theobald, 1928, ,, ,, ,, **19** : 180.

Relatively common on *Vernonia* sp. (Compositae) at Mazoe in December 1927 and January 1928.

20. *Macrosiphum jaceae*, L.

Linnaeus, 1746, Faun. Suec., 991.
Theobald, 1926, Aphididae of Great Britain, **1** : 94.

A single alate specimen was taken on *Vernonia* sp. nr. *zanzibarensis* (Compositae) at Embeza, 12.iii.28. It agreed so closely in every respect with *jaceae*, L., that there can be no doubt as to its identity.

21. *Macrosiphum nigrinectaria*, Theo.

Theobald, 1915, Bull. Ent. Res., **6** : 107.

Collected on *Psorospermum febrifugum* (Guttiferae) at Headlands, 29.xi.27. Originally described from Nairobi as attacking peas. In Rhodesian individuals the cauda is more slender and pointed than in typical *nigrinectaria*, but otherwise the material agrees very well with the original description and paratype slides in the writer's collection.

22. *Macrosiphum rosae*, L.

Linnaeus, 1735, Syst. Nat., **2** : 734, 9.
Theobald, 1926, Aphididae of Great Britain, **1** : 65.

Collected on roses at Mazoe in October 1927 (*H. Purdon*) and December 1928. It would appear to be relatively common at Mazoe, as it was taken several times at the end of 1927 on this host-plant. The material was typical of this well-known species.

23. **Myzus anselliae**, sp. n. (Fig. 5.)

Alate viviparous female.

Head green with a tinge of brown, thorax dark brownish-green. Abdomen grass-green—yellow-green in some specimens—with a dull brownish-green zone at the base of the cornicles. Antennae somewhat shorter than the body, black with the exception of I and II and the base of III. Head with frontal tubercles small but distinct and divergent. Frons with a few minute spatulate spines. Legs semitransparent green with the exception of the distal $\frac{1}{3}$ of the femora, the base and distal $\frac{1}{4}$ of the tibiae, which are dark brown, and the tarsi which are very dark brown or black. Cornicles black, cauda pale grass-green. Wing-venation usually normal, but in one instance the media was only once branched. Proboscis extending to between the mid and hind coxae.

Antennae of six segments. Segment I a little longer and much wider than II, gibbous on its inner edge. Segment III with from 4–12 sensoria of various sizes in a single row at irregular intervals, they are chiefly confined to the basal half and rarely extend to the apex. The average of 14 examples gave 9 sensoria. Segment IV about $\frac{2}{3}$ the length of III and slightly longer than V. Segment VI about $1\frac{1}{2}$ times the length of III the flagellum being $5\frac{1}{2}$ times as long as the base. Segments III–VI imbricated. Cornicles long, tapering

slightly and faintly imbricated with rather less than the apical third reticulated; a little shorter than the 3rd antennal segment. Cauda about ½ the length of the cornicles, conical and rounded at the apex but not constricted at the base, with four pairs of lateral hairs and one in a subapical position. There may be one or two additional setae, but where these are present they do not occur laterally.

Length, 2 mm.

Apterous viviparous female.

Grass-green to yellow green. Antennae about ⅔ the length of the body with segment VI black, distal ⅓ to ½ of V and base, distal end of IV and extreme base, and distal end of III, dark; remainder pale semitransparent green. Head with marked frontal tubercles which tend in some specimens to be directed inwards; they are more conspicuous than in the case of the alate. Frons with a few minute spatulate hairs as in the alate, these occur also on the 3rd antennal segment. Legs as in the alate, but the darkened areas are rather

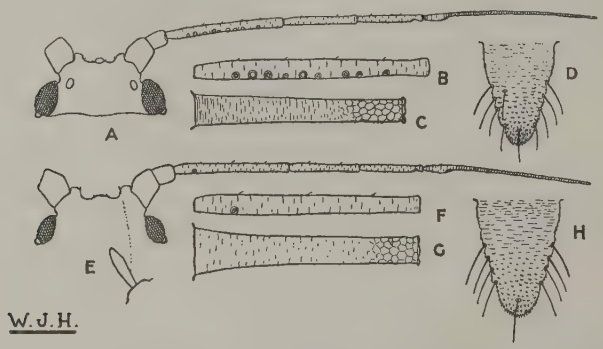


FIG. 5.—*Myzus anselliae*, sp. n.

Alate viviparous ♀: A, antenna and part of head, × *c.* 45; B, 3rd antennal segment, × 95; C, cornicle, × 95; D, cauda, × 95; Apterous viviparous ♀: E, antenna and part of head, × *c.* 45; F, 3rd antennal segment, × 95; G, cornicle, × 95; H, cauda, × 95.

smaller. Cornicles black with indications of a brownish zone at their base. Cauda pale grass-green. Proboscis extending to between the mid and hind coxae.

Antennae of six segments. Segment I a little longer but much wider than II; gibbous on its inner edge. Segment III with 0–2 sensoria near the base, in the great majority of specimens a single sensorium is present. Segment IV about ⅔ the length of III and either the same length or slightly longer than V. Segment VI half as long again as III with the base just over ⅕ the length of the flagellum. All segments except the basal two imbricated. Cornicles long cylindrical, slightly swollen basally, approximately the same length as the 3rd antennal segment; apical ¼ with reticulate markings, remainder imbricated. The cornicles are slightly stouter than in the case of the alate. Cauda about ½ as long as the cornicles, stout and rounded, with four lateral hairs on either side and a single one in a subapical position.

Length, 2 mm.

Food-plant. *Ansellia gigantea* (Orchidaceae).

Locality. Mazoe, 17.x.27.

Remarks. No species of *Myzus* quite comparable with this has been traced. It is certainly distinct from *M. circumflexus*, Buckton, a species that has also been recorded as attacking Orchidaceae.

24. *Myzus persicae*, Sulz.

Sulzer, 1776, Abgek. Gesch. Ins., 105.
Theobald, 1926, Aphididae of Great Britain, **1** : 318.

This cosmopolitan species has been taken on various species of *Brassica* including rape, cabbage and cauliflower at Mazoe at the end of 1927 and early 1928. It is probable that in S. Rhodesia, as elsewhere, it has a wide range of host-plants.

25. *Pentalonia nigronervosa*, Coq.

Coquerel, 1859, Ann. Soc. ent. Fr., (3) **7** : 259.
Theobald, 1926, Aphididae of Great Britain, **1** : 361.

This interesting species is common on bananas at Mazoe and can be found at almost any time of the year.

26. *Tetraneura hirsuta*, Baker.

Dryopeia hirsuta, Baker, 1921, Month. Bull. Dept. Agric. Calif., (4) **10** : 159.
Tetraneura hirsuta, Theobald, 1928, Entomologist, **61** : 221.

Collected on the roots of *Cynodon dactylon* and *Panicum novemnerve* (Gramineae) at Mazoe, 12.i.28, 12.xii.28, 6.iii.29 and 17.iii.29.

The alates are a dull dark green with darker head and thoracic bosses, whilst the apterae are globose, straw coloured, with a very fine coating of pulverulent matter which is denser on the head and towards the tip of the abdomen and gives the insect a slightly frosted appearance. This species is characterised by the marginal fringe of long slender hairs.

27. *Geoica lucifuga*, Zehn.

Tetraneura lucifuga, Zehntner, 1897, Arch. Java Suiker Ind., **5** : 555.
Geoica lucifuga, Takahashi, 1921, Aphididae of Formosa, **1** : 96, and 1923 (Rep. Dept. Agric. Formosa, **4**), **2** : 151.

Collected on the roots of barley (*Hordeum vulgare*) at Mazoe, 31.x.27, and *Eleusine indica*, Mazoe, 12.xii.28.

The alates are jet black. The abdomen has a pulverulent white covering which is frequently rubbed off on the crest of each segment giving a banded appearance. The apterae are very globose, almost spherical, and either straw coloured or very pale yellow-brown. The entire body is covered with a thin film of white pulverulent matter.

28. *Trifidaphis phaseoli*, Pass.

Tychea phaseoli, Passerini, 1860, Gli Afidi, 39.
,, ,, Theobald, 1915, Bull. Ent. Res., **6** : 149.
Trifidaphis phaseoli, Theobald, 1929, Aphididae of Great Britain, **3** : 208.
Forda natalensis, Theobald, 1920, Bull. Ent. Res., **11** : 71.

On the roots of tomato, Mazoe, 17.xii.28.

Rhodesian specimens agree in all essential details with authentic specimens of *phaseoli* in the writer's collection.

F. natalensis was described by the late Prof. Theobald from apterous individuals only, collected on the roots of a weed and in an ant's nest in Natal. The apterae of the Rhodesian material agree exactly with a paratype slide of *F. natalensis* ex coll. Theobald, and also with the original description of that species which incidentally would fit *phaseoli* equally well.

Two alates were taken amongst the colony found on the tomato roots, and these agree perfectly with those of *phaseoli*. The antennae are of six segments with segment II considerably longer than I as in the apterous form, and the wing-venation and general characteristics are typical. Under the circumstances, it seems that *F. natalensis* must be sunk as a synonym of *Trifidaphis phaseoli*, Pass.

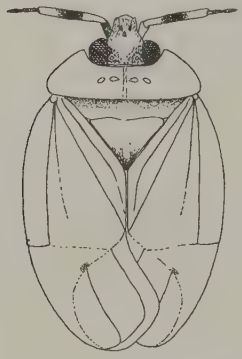
NOTES ON THE GENERA OF ISOMETOPINAE (HETEROPTERA)

By W. L. McAtee and J. R. Malloch.

In 1924 we published a short paper * dealing in part with available material of this group and on its relations with the Miridae. Since then we have examined specimens in various European collections and borrowed valuable Isometopine material from the Helsingfors Museum through the courtesy of Dr. Hakan Lindberg. We now present a revised key to the genera based not only on specimens but also on published illustrations. Reliance on the latter may be conducive to error, but we trust, nevertheless, that the key may prove both workable and useful. In addition to the key, notes are given also on forms known to us only from descriptions. Isometopinae as treated herein include only Heteroptera which possess bisegmented tarsi, a quadri-segmented beak, distinct ocelli, and one or two closed cells in the membrane of the fore-wings.

Key to the Tribes.

1. Head porrect; membrane with two closed cells which almost reach apex of fore-wing; cuneus extending to apex of fore-wing (fig. 4) . . . Diphlebini.
   Head vertical or nearly so; membrane with one or two closed cells which usually are less than half its length and fall considerably short of apex of fore-wing; cuneus usually ending far from apex of fore-wing (figs. 14, & 18–20) . . . . . Isometopini.



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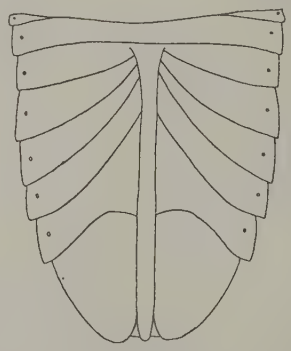

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Fig. 4.—*Diphleps unica*, dorsal view; fig. 12, do. venter of abdomen of female.

Tribe Diphlebini.

A single genus known, which however Bergroth described under two different names based on the sexes.

Genus *Diphleps*, Bergroth.

Diphleps, Bergroth, E., 1924, Not. Ent., **4**: 5–7, figs. 1–2 [Monobasic, genotype *D. unica*, Ohio]. *Teratodia*, Bergroth, E., ibid., pp. 7–8, figs. 3–4 [Monobasic, genotype *T. emoritura*, Virginia].

In our paper *Diphleps unica* was figured, redescribed and recorded also from Illinois and Maryland (pp. 73–74, figs. 4–7). See figs. 4 & 12.

* 1924, "Some Annectant Bugs of the Superfamily Cimicoideae (Heteroptera)," *Bull. Brooklyn Ent. Soc.*, **19**: 69–82, Pl. 1.

Tribe Isometopini.

Key to the Divisions.

1. Clavus parallel-sided or slightly widened posteriorly, always produced beyond apex of scutellum, sometimes about as far as length of latter, and forming a distinct commissure (figs. 14, & 18–19) . . . . . Myiommaria.
   Clavus narrowed posteriorly extending to or but slightly beyond apex of scutellum and scarcely forming a distinct commissure (fig. 21) . Isometoparia.

Key to the genera of Myiommaria.

1. Cuneus nearly as long as membrane, extending almost to apex of fore-wing *Nesocrypha*, Kirkaldy.
   Cuneus only about half as long as membrane, falling far short of apex of fore-wing (figs. 14, & 18–19) . . . . . 2.
2. Second and third segments of antenna subequal in length and diameter . 3.
   Second and third segments of antenna not subequal in length, the second much longer and thicker than third . . . . . 4.
3. Fourth antennal segment much shorter than third; costa of fore-wing without a deep notch between embolium and cuneus . . *Jehania*, Distant.
   Fourth antennal segment but little shorter than third; costa of fore-wing with a deep notch between embolium and cuneus . . . *Bilia*, Distant.
4. Second antennal segment excessively thickened or expanded, wider than hind-femur (fig. 8) . . . . . 5.
   Second antennal segment otherwise (fig. 10). . . . . 6.
5. Basal segment of antenna short and globosely incrassate, not as long as 3 and 4 together; second segment laminately incrassate, widened gradually from base; head seen from above with the lateral margins evenly rounded *Sophianus*, Distant.
   Basal segment of antenna longer than 3 and 4 together, with a stout spur above and another below; second segment widened abruptly from base, in the form of a thin plate with the lateral edges turned in, causing it to assume a husk-like shape (figs. 8, 9); head seen from above with a small sharp protuberance on each side behind antennal insertion *Alcecoris*, McAtee & Malloch.
6. Pronotum without lateral carina except posteriorly . . . . . 7.
   Pronotum with a complete lateral carina, sometimes laminately expanded . 8.
7. Pronotum convex posteriorly, without a transverse impression; scutellum moderately inflated in general, the apex rounded, prominent; front not produced downwardly . . . . . *Lidopus*, Gibson.
   Pronotum distinctly concave posteriorly, with a deep transverse impression; scutellum with a semiglobular elevation posteriorly; front produced downwardly beyond base of beak (figs. 11 & 17) *Wetmorea*, McAtee & Malloch.
8. Membrane with two closed cells (fig. 18); pronotum with a distinct impressed transverse line, and a quite deep median longitudinal incision near anterior margin, the disk on each side of the incision calloused and tumid (fig. 14) . . . . . *Isometopidea*, Poppius.
   Membrane with one closed cell; pronotum otherwise . . . . . 9.
9. Head higher than wide, only about half as wide as hind margin of pronotum; antenna inserted next lateral margin of head below the lower angle of eye; apical segment much shorter than subapical segment (fig. 10) *Myiomma*, Puton.
   Head wider than high, more than half as wide as hind margin of pronotum; antenna inserted remote from lateral margin of head, distinctly discad of the lower angle of eye; apical and subapical segments similar in form and length. . . . . *Corticoris*, McAtee & Malloch.

Genus *Nesocrypha*, Kirkaldy.

Nesocrypha, Kirkaldy, G. W., 1908, A Catalogue of the Hemiptera of Fiji. Proc. Linn. Soc. N.S.W., **33** : 375–376 [Monobasic, genotype *N. corticicola*, Fiji].

The type specimen examined by us through the kindness of Mr. Otto H. Swezey, is labelled "under bark of native fig, Fiji, 8.12.05." This insect resembles *Diphleps unica* in texture and coloration and approaches it in posterior extension of cuneus, but has a vertical head and different venation as noted in key.

Genus *Jehania*, Distant.

Jehania, Distant, W. L., 1910, The Fauna of British India, Rhynchota, **5** : 293–294, fig. 165 [Monobasic, genotype *J. mahal*, E. Himalayas, India, p. 294].

Genus *Bilia*, Distant.

Bilia, Distant, W. L., 1904, The Fauna of British India, Rhynchota, **2** : 480, fig. 313 [Monobasic, genotype *B. fracta*, Ceylon].

Mr. China who has kindly given us notes on the type states that "ocelli are present and it is an undoubted Isometopid."

Genus *Sophianus*, Distant.

Sophianus, Distant, W. L., 1904, The Fauna of British India, Rhynchota II, pp. 485–486, fig. 319 [Monobasic, genotype *S. alces*, Ceylon, p. 486].

Genus *Alcecoris*, McAtee & Malloch.

Alcecoris, McAtee, W. L., and Malloch, J. R., 1924, Bull. Brooklyn Ent. Soc., **19** : 80–81, Pl. 1, figs. 16–17 [Monobasic, genotype *A. periscopus*, Timor].

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FIG. 8.—*Alcecoris periscopus*, head and antennae from in front; fig. 9, do. second antennal segment from behind.

Genus *Lidopus*, Gibson.

Lidopus, Gibson, E. H., 1917, Bull. Brooklyn Ent. Soc., **12** : 74 [Monobasic, genotype *L. heidemanni*, Texas].

A key to two species of *Lidopus* is given in our 1924 paper, p. 77.

Genus *Wetmorea*, McAtee & Malloch.

Wetmorea, McAtee, W. L., and Malloch, J. R., 1924, Bull. Brooklyn Ent. Soc., **19** : 80, Pl. 1, figs. 14–15 [Monobasic, genotype *W. notabilis*, Arizona].

11 17

FIG. 11.—*Wetmorea notabilis*, head from in front; fig. 17, do. head and thorax in profile.

Genus *Isometopidea*, Poppius.

Isometopidea, Poppius, B., 1913, Ent. Tidskr., **34**: 251–253 [Monobasic, genotype *I. lieweni*, Ceylon]. We have studied the type specimen.

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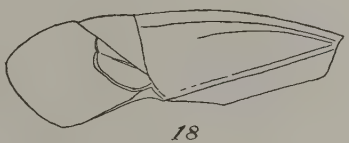

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Fig. 14.—*Isometopidea lieweni*, dorsal view, antennae and legs omitted; fig. 18, do. hemelytron.

Genus *Myiomma*, Puton.

Myiomma, Puton, A., 1872, Pet. Nouv. Ent., **4**: (44), 177 [Monobasic, genotype *M. fieberi*, France]. A figure was published in 1873, Ann. Soc. ent. Fr., (5), **3**: Pl. 1, fig. 3 (with structural details also in figs. 3*a* to 3*f*).

Heidemannia, Uhler, P. R., 1890 (1891), Proc. Ent. Soc. Wash., **2**: 119–121, fig. 7 [Monobasic, genotype *H. cixiiformis*, Maryland, Virginia].

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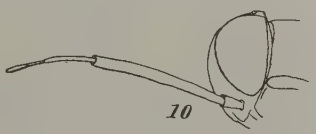

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Fig. 3.—*Myiomma cixiiformis*, head of female from above; fig. 10, do. head of male in profile.

Genus *Corticoris*, McAtee & Malloch.

Corticoris, McAtee, W. L., and Malloch, J. R., 1922, Proc. Biol. Soc. Wash.,

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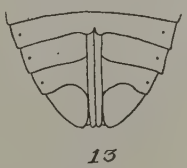

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Fig. 1.—*Corticoris unicolor*, head of male from above; fig. 2, *C. pulchellus*, head of female from above; fig. 13, do. venter of abdomen of female; fig. 19, *C. unicolor*, hemelytron.

35 : 95 [New name for *Isometopus* of authors as applied to American species, not of Fieber, genotype *I. pulchellus*, Heidemann, Virginia, New York].

Dendroscirtus, Bergroth, E., 1924, Not. Ent., **4 :** 4. [A substitute for the preceding name, considered hybrid.]

A key to the four known species of *Corticoris* is given in our 1924 paper, pp. 78–79. See figs. 1–2, 13 & 19.

Key to the genera of Isometoparia.

1. Lateral and posterior walls of head jointly produced downward below eye, forming an open triangular socket in which the antenna is inserted below posterior part of eye; second segment of antenna not thicker than the others (fig. 21); third and fourth unknown . . . . . **Ptisca,** gen. n.
   In males the head may be produced below eyes, but the production does not involve the hind wall; there is no socket and the antenna is inserted below anterior part of eye (figs. 6 & 15) . . . . . *Isometopus*, Fieber.

Genus **Ptisca**, gen. n.

Like *Isometopus*, but much larger than previously described forms and differing as stated in key.

Genotype : the following new species :—

Ptisca blattiformis, sp. n. Frons silvery, clypeus honey-yellow, castaneous laterally, margin of head below eye pale coral-red, eyes and ocelli reddish-brown. Pronotum with a posteriorly expanding discal fuscous mark, yellow-brown laterad of this, the explanate margins translucent. Scutellum fuscous extreme apex pale. Hemelytra paler fuscous, the membrane and expanded costa palest. First segment of antenna stramineous on basal castaneous on apical half, second segment shading gradually from stramineous at base to castaneous at apex. Legs fuscous. Venter reddish. Head of about the form of a quarter of a sphere, eye large, margin of head produced below it in a process that is angulate as seen from side (fig. 21); clypeus roundingly produced although not quite as

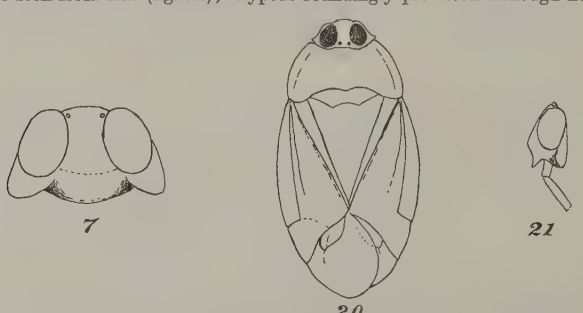


Fig. 7.—*Ptisca blattiformis*, sp. n., head from in front; fig. 20, do. dorsal view, antennae and legs omitted; fig. 21, do. head in profile.

far in middle as are the postero-lateral angles of head; ocelli conspicuous near posterior margin of vertex and almost touching eyes. Lateral margins of pronotum and hemelytra distinctly explanate. Upper surface distinctly and about evenly punctate except for head, which is finely punctate and membrane which is wrinkled. Scutellum including exposed mesoscutum considerably longer than head and pronotum together. Length of insect, 4 mm. (fig. 20).

Holotype ♂, Kamerun, Joh. Albrechtshöhe, 11.iv–27.v.'98. *Conradt* (Helsingfors Museum).

Genus *Isometopus* Fieber.

Cephalocoris, Stein, J. P. C. F., 1860, Berlin. ent. Z., **4 :** 79 [Monobasic, genotype *Acanthia intrusa*, Herrich-Schäffer, Europe]. This name antedates *Isometopus* Fieber published in the same year, but is preoccupied so that Fieber's name must be used.

Isometopus, Fieber, F. X., 1860, Wien. ent. Mon., **4 :** 259, Pl. VI, *a*. [Two species included. *Acanthia intrusa*, H.-S., and *I. alienus*, of which the former was named as type by Distant, 1904, Fauna of British India, Rhynchota, **2 :** 484.]

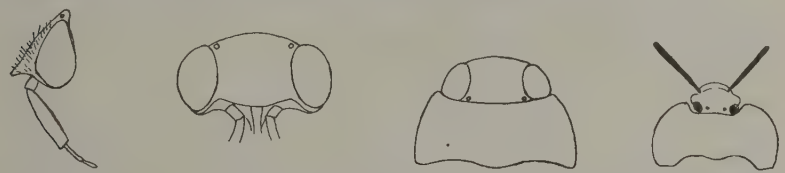
Turnebus, Distant, W. L., 1904, Fauna of British India, Rhynchota, **2 :** 485, fig. 318 [Monobasic, genotype *T. cuneatus*, Ceylon].

Skapana, Distant, W. L., 1910, Rhynchota Malayana III, Rec. Ind. Mus., **5 :** 315, Pl. 21, figs. 8, 8*a* [Monobasic, genotype, *T. typica*, Borneo, p. 316].

Palonella, Poppius, B., 1914, Arch. Naturges, **80**, (A) 8 : 76 [Monobasic, genotype *Isometopus feanus*, Distant, Burma]. See figs. 5–6.

The genotype is described in 1904, Fauna of British India, Rhynchota, **2 :** 484, fig. 317. Regardless of agreement of author and artist that antennae are missing, they are present in the type which we have studied.

Examination of genotypes of all the proposed genera listed here under *Isometopus* might reveal characters justifying recognition of some of them. Authors have ignored the great sexual differences there are in the structure of the heads of these insects and have made too much of the slightly varying thickness of antennal segments not otherwise modified.



5 *6* *22* *23*

Fig. 5.—*Isometopus feanus*, head in profile; fig. 6, do. head from in front; fig. 22, head and pronotum dorsal view; fig. 23, *I. typicus*, head and pronotum, dorsal view (after Distant).

Notes on Genera of which neither Specimens nor Illustrations have been seen.

Genus *Eurocrypha*, Kirkaldy.

Eurocrypha, Kirkaldy, G. W., 1907, Proc. Linn. Soc. N.S.W., **32 :** 784 [Monobasic, genotype *E. thanatochlamys*, Bundaberg, Australia].

Mr. Swezey informs us that the type was loaned to Bergroth in 1919, but that its present location is unknown. The genus appears near to if not synonymous with *Isometopus*. Kirkaldy's description of the antenna evidently is erroneous, the second segment being mistaken for the fourth.

Genus *Turnebiella*, Poppius.

Turnebiella, Poppius, B., 1914, Arch. Naturges., **80**, (A) 8 : 75–76 [Monobasic, genotype *T. pallipes*, Formosa]. Poppius compares this genus with forms in the Isometoparia, but Bergroth who saw the type places it in the Myiommaria. According to notes from the original description, the genus runs in our key to *Bilia*, and the descriptions of these forms tally in a remark-

able number of details. Mr. China, to whom we have submitted the case, however, deems them distinct. He notes especially that the pronotum of *Bilia* is only obscurely transversely impressed behind the calli, and that the scutellum is longer than pronotum and its base is not uncovered.

Key to the species of Myiomma *based principally on colour.**

1. Colour above chiefly fuscous to black; base of cuneus whitish; antennae inserted far below lower margin of eye and close to back of head; the eye not emarginate (fig. 10) . . . . . 2.
   Colour above otherwise, base of cuneus not whitish; antennae inserted close to eye, the latter with a rounded emargination over the insertion . . 4.
2. Upper surface excluding head and sometimes extreme apex of scutellum without pale markings other than cuneal bar; hind tibia with a faint preapical broad yellow band . *cixiiformis*, Uhler (Long Id., N.Y., to W. Va., U.S.A.).
   Upper surface with additional pale markings; hind tibia with two conspicuous yellowish bands . . . . . 3.
3. Three alternatives:
   Extreme apex of scutellum whitish; face black below lower level of eyes *fieberi* var. *fieberi*, Puton (France, Herzegovina).
   Apical half of scutellum whitish, mesonotal prominences and anterior pronotal margin pale yellowish; face largely yellow below lower level of eyes . . . . . *fieberi* var. **riffia,** var. n. (Algeria).
   Extreme apex of scutellum whitish, mesonotal prominences, middle of anterior margin, and most of hind margin, of pronotum, embolium and indistinct patch on middle of corium, pale yellowish *fieberi* var. **kabylia,** var. n. (Algeria).
4. Colour above luteous, mesonotal prominences pale orange; calloused V-shaped marking on apex of scutellum whitish . . . **lutea,** sp. n. (India).
   Colour above pale yellowish with fuscous variegation, most pronounced on anterior half of pronotum . . . . . **vittata,** sp. n. (Ceylon).

Myiomma fieberi var. **riffia,** var. n.

Deep fuscous above, anterior margin of pronotum stramineous, mesonotal prominences dusky yellowish, apical half of scutellum and basal third of cuneus whitish; membrane dusky hyaline. Eyes livid, remainder of head in general pale yellowish, with a dark brownish spot between eyes connected by a narrow stripe to a brownish patch surrounding ocelli; dark brown spot each side below eyes; antennae fuscous, the segments narrowly pale basally; legs fuscous, tibiae each with a median and a terminal testaceous annulus.

Length, 2·5 mm.

Holotype ♀, Algeria, Ain Aissa (Helsingfors Museum).

Myiomma fieberi var. **kabylia,** var. n.

Fuscous above, blackish anteriorly; middle of anterior border of pronotum, hind margin between humeral prominences (interrupted medially), embolium and a central patch on each corium, pale yellowish; the mesonotal prominences are more orange, and the apex of scutellum and base of cuneus more whitish; membrane fumose. Eyes livid, face below eyes black; front and narrow areas laterad of eyes pale yellowish, front with a spot and short connected vitta above it brown. Antennae and legs as in the previously described form.

Length, 3 mm.

Holotype ♀, Algeria, Yakouren, Kabylia, 1901, *A. Chobaut* (Helsingfors Mus.).

* Paucity of material, especially the lack of representatives of both sexes of all the species, renders present preparation of adequate keys impossible. We acknowledge the incomplete state of those here presented for *Myiomma* and *Isometopus*, but trust they will, nevertheless, have some value.

Myiomma lutea, sp. n.

Colour above luteous, mesonotal prominences pale orange, scutellum with narrow base, and broader V-shaped marking overlying most of lateral margins and apex, whitish, the surface occupied by the latter marking impunctate; membrane pale fumose. Eyes fuscous, front and ocellar prominence red; face below antennae fuscous, between that part and eyes yellow, tinged with reddish; venter fuscous.

Length, 2·25 mm.

Holotype ♀, India, Matheran, Kolaba District, 800 metres, Biro, 1902 (Helsingfors Museum).

Myiomma vittata, sp. n.

Colour above pale lemon-yellowish modified chiefly by the varying intensity of the dark puncturing; pronotum most infuscated, with the following paler areas, a complete median and two incomplete (posterior) sublateral vittae, and narrow hind margin, of the ground-colour; scutellum with basal angles, a subapical bar and extreme apex fuscous; base of each corium with a small fuscous spot, corium generally infuscated apically, the cuneus paler, and its apex again infuscated; cuneus more strongly haired than in the other species; membrane fumose; eyes fuscous discally, whitish marginally, remainder of head reddish-brown with two pale yellow spots between eyes; antenna fuscous except for distal portions of 2nd segment; underside of thorax and abdomen castaneous; coxa, basal $\frac{2}{3}$ of middle femur, and basal $\frac{1}{3}$ of hind femur stramineous, remainder fuscous; tibiae fuscous, the fore with apical, and the others with both apical and subapical pale annuli.

Length, 3·25 mm.

Holotype ♂, Ceylon, Pattipola, 2000 metres, Biro, 1902 (Helsingfors Museum).

Key to the species of Isometopus *based chiefly on colour.*

1. Concolourous above . . . . . 2.
   With more or less pale marking above . . . . . 3.
2. Coarsely punctate and conspicuously hairy; front margin of head convex; vertex convex between ocelli (fig. 6) . . . . *feanus,* Distant (Burma).
   Finely punctate and inconspicuously hairy; front margin of head angulate; vertex longitudinally concave between ocelli . *heterocephalus,* Puton (Algeria).
3. Only extreme apex of scutellum pale . . . . . 4.
   Pale markings more extensive . . . . . 6.
4. Upper surface chiefly dark . . . . . 5.
   Whole clavus and corium whitish . . . . **bicolor,** sp. n. (East Africa).
5. Face with three raised white and three depressed black lines paralleling anterior margin . . . . . *taeniaticeps,* Puton (Syria).
   Face concolorous . . . . . *intrusus,* Herrich-Schaeffer (Europe, Algeria).
6. Entire disk of scutellum pale . . . . . 7.
   Scutellum otherwise . . . . . 8.
7. Scutellum and parts anterior ochraceous, corium black, membrane fumose *cuneatus,* Distant (Ceylon).
   Vertex, pronotum excepting posterior disk, scutellum, and most of cuneus, ochraceous, remainder of upper surface blackish except membrane which is fumose . . . . . *typicus,* Distant (Borneo).
8. Lateral margin of scutellum, adjacent strip of corium, and embolium whitish **peltatus,** sp. n. (Sudan).
   A broad band across corium, embolium, and cuneus, also most of pronotum and apical half of scutellum, whitish *mirificus* Mulsant & Rey (France, Hungary).

Isometopus bicolor, sp. n.

Back of head, and pronotum and scutellum chiefly deep fuscous; narrow lateral margin of pronotum hyaline, apex of scutellum, clavus and corium whitish, cuneus with a fuscous marking along fracture widening interiorly, membrane whitish hyaline; eyes pinkish, ocelli red, face pale yellow, rather inflated; first and second segments of antenna distinctly thickened, fuscous except basal fourth of the second, which is pale, third segment pale, fourth infuscated.

Length, about 2·25 mm.

Holotype (sex ?, probably ♂). German E. Africa, Langenburg, Nov. 24, 1899, *Fülleborn* (Helsingfors Museum).

Isometopus peltatus, sp. n.

Fuscous, darkest on pronotum, lateral margins and apex of scutellum, clavus, and almost equal area of adjacent corium, and embolium whitish; membrane fumose; eyes slaty, remainder of head pale fuscous; face broader on lower than on upper margin, the antero-lateral angles rounded, a concavity between each angle and the rather prominent clypeus (figs. 15–16); antennae testaceous.

Length, about 2·5 mm.

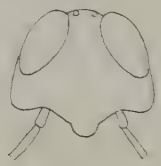


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Fig. 15.—*Isometopus peltatus*, head from in front; fig. 16, do. head in profile.

Holotype (sex ?, probably ♀). Africa, Bismarcksburg, Togo, Sudan, Jan. 21, 1893, *L. Conradt* (Helsingfors Museum).

ON NEW ORIENTAL GENERA AND SPECIES OF THE HEPIALOIDEA (LEPIDOPTERA HOMONEURA)

PART I: DESCRIPTIONS OF NEW GENERA AND SPECIES

By Prof. Syûti T. Issiki, F.E.S., and Herbert Stringer.

The genera belonging to the superfamily Hepialoidea, but not to the family Hepialidae, have not been recorded from the Oriental Region before. In other Regions, the Prototheoridae (including the genera *Prototheora* and *Metatheora*) was established by Meyrick in 1917 on South African material, Anomosetidae (with only one genus *Anomoses*) and Palaeosetidae (with only one genus *Palaeoses*) by Turner in 1921 on Australian material. After a detailed structural examination, Philpott (1928) sunk Anomosetidae under Prototheoridae.

The new forms described here, show, in their most important characters, affinities with *Palaeoses*, and, though in some characters they show more specialisation than in this genus, in other respects they are more archaic and show some affinities with *Anomoses*, thus providing an interesting link between Palaeosetidae and Prototheoridae.

We wish here to place on record our grateful thanks to Mr. W. H. T. Tams for his assistance and ever ready advice in the preparation of this paper.

GENUSTES, gen. n.

(Type *Genustes lutata*, sp. n.)

Head small, smoothly and evenly scaled. Eyes large. Ocelli absent, a pair of minute chitinous processes on vertex. Mandibles, tongue and maxillary palpi absent. Labial palpi with three segments, porrect, clothed with loosely appressed hair-scales tapering to a point, terminal segment hidden. *Antennae* very short ($\frac{1}{6}$) with fifteen segments, pubescent. *Thorax* smooth, patagia small, forming small erect tufts. *Abdomen* of medium length with a weak anal tuft. Legs: posterior tibiae much thickened with fold containing hair-pencil, with one short apical spur, middle tibiae with one short apical spur. *Fore-wings:* jugum present, neuration 1*b* (1*A*) short without furcation, 1*c* (Cu_2) short and weak not extending to the margin, 2 (Cu_{1b}) from before angle, 3 (Cu_{1a}) from angle, transverse vein angulated inward between 4–5 (M_3–M_2) emitting an internal vein at angle to lower margin of cell at one-third, 4–6 (M_3–M_1) parallel, 7–8 (R_5–R_4) short stalked, 9–10 (R_3–R_2) long stalked, 9 to apex, 11 (R_1) from beyond middle of cell, 12 (Sc_2) from base to three-fourths of costa sending out a short oblique vein 13 (Sc_1) about the middle. *Hind-wings* elongate ovate, neuration nearly as in fore-wings, but 1*c* ($Cu_2$1) stronger and 12 (Sc_2) without short median branch 13 (Sc_1).

Genustes lutata, sp. n.

♂. 14–18 mm. *Head*, palpi and thorax golden brown. *Antennae* fuscous. *Abdomen* drab fuscous, anal tuft paler. Legs drab fuscous, with faint tarsal annulations, posterior tibiae with fold containing long buff-hair-pencil. *Fore-wings* broadly trapezoidal, costa slightly arched, apex round pointed, termen oblique, rounded; light ochreous thickly suffused with fuscous scales from base to two-thirds; three quadrate fuscous patches along costa, the first at one-fourth, second at the middle, third at three-fourths; a series of eight ocellate silvery white black-ringed spots with a fuscous suffusion from apex, running parallel to the termen but broken at the fifth spot and continuing nearer the termen and around tornus; slightly above the last spot is a confluent pair of ocellate spots followed by another

at one-third, not touching dorsum, the centre of these spots, at some angles, appearing as raised silvery scales; cilia light ochreous with black points along their outer edge. *Hind-wings* elongate ovate; drab fuscous; cilia ochraceous, a fuscous median line throughout.

Holotype ♂: Assam, Khasias, Cherra Punji, v.1894 (*Doherty*). 25 specimens. (Type in British Museum.)

OGYGIOSES, gen. n.

(Type *Ogygioses caliginosa,* sp. n.)

Head small with long rough hairs, face short. Mandibles absent. Ocelli absent, a pair of minute chitinous processes on vertex. Tongue absent. Maxillary palpi rudimentary. Labial palpi porrect, wholly clothed with long rough spreading hair-scales; two-segmented, the basal segment very short, the terminal segment about three times the length of basal. *Antennae* very short ($\frac{1}{6}$) with seventeen segments, moderately and evenly clothed over their whole surface. *Thorax* with long rough hairs and posterior crest. *Abdomen* short, slender, each segment with short protruding hair-scales, a thick anal tuft in ♂. Legs without spurs, posterior tibiae thickened with fold containing long hair-pencil, middle and anterior pairs wholly clothed with long projecting hair-scales. *Fore-wings* without jugum; neuration 1*b* (1*A*) short without furcation, 1*c* (Cu_2) short and weak, not extending to wing margin, 2 (Cu_{1b}) from beyond middle of cell, 3 (Cu_{1a}) from angle, 4–7 (M_3–R_5) parallel, transverse vein angulated inward between 4–5 (M_3–M_2) emitting an internal vein at angle, reaching lower margin of cell at about one-third, 7 (R_5) from angle of cell, 8 (R_4) out of 9–10 (R_3–R_2), 9 and 10 long-stalked, 9 (R_3) to apex, 11 (R_1) from about the middle of cell, 12 (*Sc*) from base of cell to three-fourths of costa. *Hind-wings* elongate ovate; neuration as in fore-wings, internal vein to base of wing connected by short cross-bar near base.

Ogygioses caliginosa, sp. n.

♂. 15 mm. *Head* and *thorax* bronzy fuscous. *Antennae* and palpi fuscous. *Abdomen* fuscous. Legs ochraceous; hind tibiae with fold containing long hair-pencil; without spurs. *Fore-wings* elongate ovate, costa slightly sinuate, apex round pointed, termen oblique rounded; bronzy fuscous with numerous irregularly shaped iridescent pale blue spots over the whole wing-surface; cilia bronzy fuscous broken with patches of ochraceous, a darker subbasal line. *Hind-wings* and cilia bronzy fuscous, with a slight violaceous sheen.

Holotype ♂: Formosa, Rantaizan iv.–v.1927 (*Issiki*). 8 specimens and 20 in alcohol. (Type Issiki Coll., paratypes in British Museum.)

Ogygioses eurata, sp. n.

♂. 12–15 mm. *Head,* antennae, palpi and thorax ochraceous tawny. *Abdomen* fuscous. Legs ochraceous tawny; posterior tibiae with fold containing long buff hair-pencil. *Fore-wings* elongate ovate, costa straight, apex round pointed, termen oblique rounded; ochraceous orange, with scattered pale blue spots over most of the wing-surface, two confluent spots near dorsum at one-third, three irregularly shaped spots at middle below fold, an inwardly oblique fascia of confluent spots from costa at three-fourths to dorsum joins these three preceding spots, a terminal fascia of confluent spots from before apex to dorsum, and four along termen, all these spots are slightly iridescent and more or less flecked with brown and black scales; there is a brownish-fuscous suffusion at base of costa to one-third; cilia ochraceous orange, some paler scales intermixed. *Hind-wings* fuscous; cilia ochraceous.

Holotype ♂: Formosa, Taihoku, Urai, 1000 ft., v.1929 (*Issiki*); Sankakuho, 8000 ft., v.1928 (*Issiki*); Kanshirei, 1000 ft., iv.1906 (*Wileman*). 4 specimens. (Type Issiki Coll., paratypes in British Museum.)

ON NEW ORIENTAL GENERA AND SPECIES OF THE HEPIALOIDEA (LEPIDOPTERA HOMONEURA)

PART II: OBSERVATIONS ON THE SYSTEMATIC POSITION

By Prof. Syûti T. Issiki, F.E.S., and Herbert Stringer.

Since the first part of this paper was published we have found that *Genustes lutata* has already been described by Hampson (1896, *Fauna of India Moths*, **4**: 474) under the name *Palpifer minutus*; this species is so different from *sexnotatus*, Moore, the genotype of *Palpifer*, that the generic name *Genusta* will stand, but *lutata* Iss. & Stringr., becomes a synonym.

1. Antennae.

The two basal segments, the scape and pedicel, are prominent in both the Oriental genera. In *Genustes* (fig. 1, A) they are composed of fifteen segments (there may be slight individual variation); between the third and eighth segments they are filiform, thence they become submoniliform to the apex, each segment being pubescent. *Ogygioses* possesses seventeen segments; between the third and fifth segment they are filiform, thence submoniliform to the apex, each segment being pubescent. There is no noticeable sexual difference. In both genera all the segments are covered with hair-scales, forming, especially

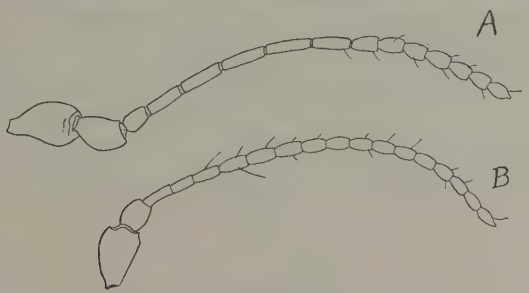

Fig. 1.—Antennae of: A, *Genustes minutus*, Hmpsn.; B. *Ogygioses caliginosa*, sp. n.

on the first two segments, a long dense tuft. In the genus *Prototheora* the antennae are composed of thirty-one segments, the segments, except the basal two, progressively tapering and lengthened towards the apex, each segment being pubescent. In the genus *Anomoses*, Philpott describes the antennae as composed of thirty-one segments, and similar to those of *Prototheora*. The antennae of the two Oriental genera, which are a sixth of the length of the fore-wing, and essentially the same, show a marked contrast to those of the Prototheoridae. We regret we have not seen the detailed structure of the antennae of *Palaeoses*, which is described as one-sixth, simple, pubescent, with which these new genera agree. In all the genera of the Prototheoridae they are described as one-fourth of the length of the fore-wing. We suspect that the structure of *Palaeoses* is similar to that of the new genera, the whorls of bristles described being due to the matted hair-scales in the dried specimen.

2. Mouth-parts.

In *Genustes* the labrum, mandibles and maxillae are entirely absent, but the labium (fig. 2, A) with large quadrate submental plate and a part of the prementum (palpiger) is prominent and bifurcate. The labial palpi have three

segments, the basal a little longer than broad, the second twice as long as the basal, the third narrow, spindle-shaped, only a little shorter than the basal, and in the natural state covered with dense, long, hair-scales. In *Ogygioses* (fig. 3) there are a pair of small protuberances, one on each side of the lower margin of the clypeus; they may be the remnant of the maxilla, as the organ is more or less preserved in almost all of the species of Hepialoidea, or they may be vestiges of mandibles, considering their position. In the labium the submental plate is weakly chitinised, somewhat broadened anteriorly, a part of the prementum

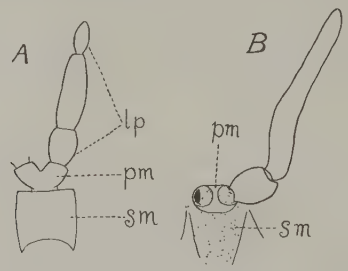

Fig. 2.—Labium of: A, *Genustes minutus*, Hmpsn.; B, *Ogygioses caliginosa*, sp. n.

is preserved, forming the base of the palpi, but not bifurcate; the palpi have two segments only, the basal segment oval, distal segment elongate and slightly curved, more than thrice as long as the basal, in a natural state covered with long rough hairs. In *Prototheora*, though we find a narrow mental plate, between the submental plate and the prementum, the labium is essentially the same as in *Genustes*, the prementum bifurcate, and palpi with three segments. We do not consider the two-segmented labial palpi of *Ogygioses* of family value, as pointed out by Philpott (1927) in the Hepialidae, in which family the labial palpi are

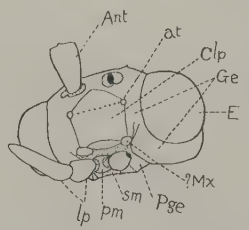

Fig. 3.—Head of *Ogygioses caliginosa*, sp. n., front view.

usually of three segments, the genus *Hectomanes* has only two short segments, and moreover *Hepialus humuli*, Linn., has practically no labial palpi. Turning next to the other superfamily of the same suborder (Issiki, 1931), in one and the same family (viz. the Micropterygidae) two-, three- or four-segmented labial palpi may be found. In *Palaeoses* the maxillae are quite lost, whereas in all the genera of the Prototheoridae the maxillae are preserved, although reduced, and haustellum and palpi may easily be observed. *Genustes* and *Ogygioses* in this respect show affinities to each other and to *Palaeoses*, though in *Ogygioses* the remnant of the maxillae is preserved in the last stage of its course of elimination.

3. Wings.

The wings of *Genustes* (fig. 4) are very broad; fore-wings trapezoidal, jugal lobe not so elongate as in the Hepialidae. Hind-wings with broadly rounded tornus, without special spine on the base of the costa. The general shape of the wings of *Ogygioses* (fig. 5), though the anal area is much reduced, is similar to that of *Palaeoses*; in the fore-wings the jugal lobe is lost and the wing-membrane of this part folds downward, but in some individuals there remains a vestige of the jugal lobe; there is no special spine at the base of the costa in the hind-wings. The most remarkable thing is the presence of the pterostigma (fig. 5 *pt*) in the fore- and hind-wings of *Ogygioses* (observed from specimens fixed by Carnoy's solution and preserved in alcohol); it is narrow and elongate and in the fore-wings extends from about the middle of costa to a little beyond the end of R_1; in the hind-wings from before the end of *Sc* to a little beyond R_1.

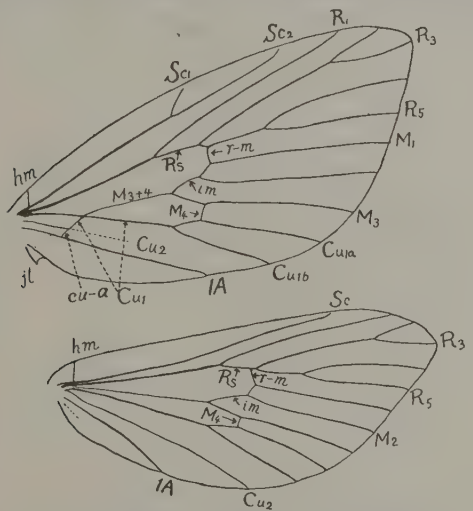

Fig. 4.—Wings of *Genustes minutus*, Hmpsn.

In the venation of *Genustes* nothing need be said about *Sc*; it is similar in all the genera of Palaeosetidae and Prototheoridae. The origin of R_1 is rather basad in *Prototheora* and *Metatheora* and distad in *Palaeoses*, *Genustes* and *Anomoses*. The dichotomously branched R_s is also common in all these genera. The cross-vein *r–m* joins the stem of R_s–M_1 in *Palaeoses*, and R_{4-5} and M_1 in the three genera of Prototheoridae; especially is this so in *Anomoses* where it joins R_{4-5} or R_5, or the point of furcation. In *Genustes r–m* is of Prototheorid type in the fore-wings and Palaeosetid in the hind-wings. In the cell the anterior branch of *M*, *i.e.* M_{1+2} is absent, and only the posterior branch M_{3+4} present; in this character *Genustes* agrees with *Palaeoses*, disagreeing with all the Prototheorid genera. M_4 is absent in *Palaeoses*, but according to the figure of Tillyard (1926) it is preserved in the hind-wing; in *Genustes* it is present in both wings and in this respect agrees with the Prototheorid genera. The condition of the veins *Cu* is common in all the genera in question, the only exception being the reduction of Cu_2 in the hind-wing of the Prototheorid genus *Anomoses*. The basal loop of the anal vein of the fore-wing of *Prototheora* and *Metatheora* does not appear in *Anomoses* (according to Dr. Turner's figure), nor is it present

in *Genustes* or *Palaeoses*, there is also no trace of $2A$ in these latter genera. In the hind-wings $1A$ is present in *Genustes*, but $2A$ reduced; in *Palaeoses* there is no trace of any of the anal veins. In *Prototheora* $1A$ is absent but there is a distinct $2A$. In *Anomoses* $1A$ is present in the ♀ only, there being no trace of it in the ♂. From the above comparison we do not consider that the relation of the cross-vein r–m and the radial sector (in other words, relation of cell and each of veins of R_5) is the most important character as it is not fixed, when the condition of all the genera of the Hepialidae are taken into consideration; and also the case of M_4 which may be unstable among individuals of *Palaeoses* (according to Turner's (1921) and Tillyard's (1926) figures). The condition of the anal veins varies much in the various genera and we cannot draw the line of distinction of grouping as far as the present-day genera are concerned. With regard to the presence or absence of M_{1+2} in the fore-wings, which is regarded as an important character by Tillyard and Philpott, *Genustes* agrees with *Palaeoses* and is opposed to any of the Prototheorid genera. Turning next to *Oggyioses*

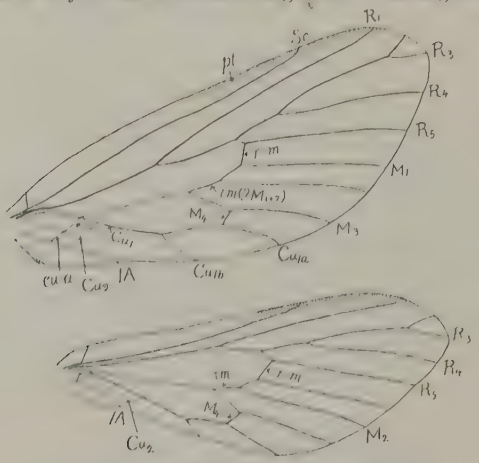

Fig. 5.—Wings of *Oggyioses caliginosa*, sp. n.

(fig. 5) Sc_1 is absent, resulting in the simple Sc. In all the genera of Prototheoridae and Palaeosetidae Sc_1 is present in the fore-wings, in *Metatheora* it is present also in the hind-wings. In the Hepialidae Sc is usually simple, but the branched Sc is present in the genus *Sthenopis*; and in a specimen of *Hepialus davidi*, Pouj., in the British Museum we find Sc_1 well preserved, whereas it is normally absent in the genus. In the Japanese *Phassus signifer*, Btlr., we find many individuals with Sc_1 preserved, though it is usually absent in the genus. We cannot therefore regard the condition of Sc as a character of much importance. The unilateral condition of the R_s is the first example noted among the genera in question. In the archaic genera of Hepialidae the veins are dichotomously branched, stalk $R_{2\ 3}$ long, stalk $R_{4\ 5}$ short, and cross-vein r m joins R_5; on the other hand, we find the unilateral branching of R_s in the Australian genera *Porina* and *Perriscetis*; also as pointed out in Micropterygidae * (Issiki, 1931),

* It must be remembered that the unilateral condition of R_s in the Micropterygidae is a result of the transfer of R_3 to stalk $R_{4\ 5}$, whereas in the case of Hepialoidea it arises from the transfer of R_4 to stalk $R_{2\ 3}$. In most of the primitive Lepidoptera $R_{2\ 3}$ is shorter than $R_{4\ 5}$, whereas in Hepialoidea the reverse is the case; in this respect the Hepialoidea agree with the archaic Trichoptera and Mecoptera.

the most archaic family of the Lepidoptera, both dichotomous and unilateral branching are only of generic value and not of family use; in this case we find we must treat this character generically. Tillyard (1926) points out that the transverse direction of M_4 is a common character of the Hepialoidea, except of the HEPIALIDAE in which it is oblique. In the cell there is no trace of M_{1+2}, only the posterior branch of M (M_{3+4}) is present; this character also strongly suggests that this genus is closely allied to *Palaeoses*. Though the anal area is much narrowed, the condition of the cubitus and anal veins is essentially of the same type as in *Genustes*, except that Cu_2 in the hind-wing is much more reduced; it is therefore unnecessary to discuss these veins further.

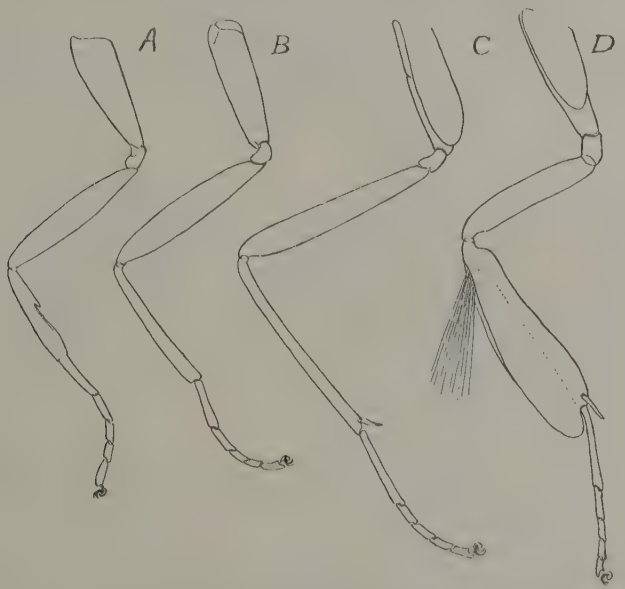

FIG. 6.—A, Fore leg of *Ogygioses caliginosa*, sp. n.; B, fore; C, middle; D, hind legs of *Genustes minutus*, Hmpsn.

4. LEGS.

In *Genustes* the fore legs (fig. 6, B) are simple, the middle pair (C) with only one reduced tibial spur at its apex, in the hind pair (D) the tibiae have also one reduced apical spur, and a broad longitudinal chitinous fold on their dorsal side, enclosing a long hair-pencil; this fold has also an inner lining of scales; this specialisation is confined to the male. In *Ogygioses* the fore legs (A) are shorter with a vestige of the tibial strigil (fig. 6, A); middle pair simple with no sign of tibial spurs; in the hind pair there is the same type of chitinous fold on the tibiae, but the tibial spurs are entirely absent. In the three genera of PROTOTHEORIDAE there is one pair of apical spurs on the middle tibiae, and two pairs on the hind tibiae; there are no tibial spurs in *Palaeoses*. The tibial spurs in the genus *Genustes* are single, not paired, one on each of the middle and hind tibiae, and are difficult to trace from pinned specimens, in which the tibiae are covered with hair-scales, whereas in those of PROTOTHEORIDAE they are as

long as in most of the other families of the Order and can easily be seen from dried specimens, all having one pair on the middle tibiae and two pairs on the hind tibiae. As for the condition of the tibial spurs in *Genustes*, we regard this as the last stage of their reduction, if their small size and loss of the usual duplication are taken into account, and only a slight increase in this reduction brings us to the condition found in *Ogygioses*, where they are totally absent. Thus it is not unnatural that we should place these forms in the same group and differentiate them from those with paired spurs.

5. Genitalia.

The general structure of the male genitalia in *Genustes* (fig. 7, A, B) is comparatively simple; there is a peculiar strongly chitinised structure (B) lying below the vinculum bearing a pair of strong chitinous caudal processes remote from each other, a pair of papilla-shaped membranous processes one on each side of the caudal processes, and a pair of elongated proximal processes of a

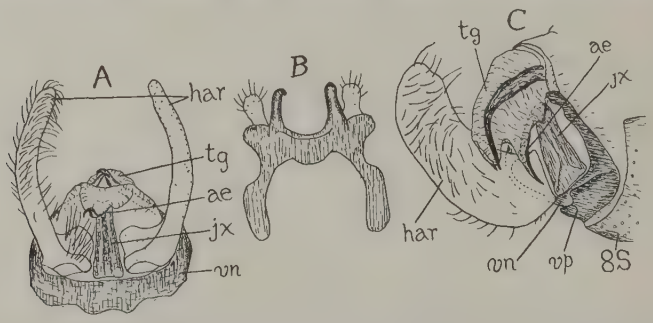

Fig. 7.—Genitalia of: A, *Genustes minutus*, Hmpsn., ventral view; B, a structure lying below the vinculum of the preceding species, ventral view; C, *Ogygioses caliginosa*, sp. n., latero-caudal-view, the right harpes removed.

saccus-like appearance widely remote from each other, probably representing the modified eighth sternite; the tegumen (*tg*) is narrow, membranous, framed laterally in a pair of strips of chitin, which are pointed and curved at the apex in uncus-like form and showing a quite different type of structure from those of *Palaeoses* (Eyer, 1925); the vinculum (*vn*) is short, but strongly chitinised, and without ventral plate as in *Ogygioses*; the harpes (*har*) are simple, long, finger-shaped, extending inward at the base, and show a strong contrast against those of *Palaeoses* which are deeply divided. The juxta (*jx*) is a narrow, elongate and thinly chitinised plate, somewhat thick on its median line, situated on the meson directly caudad of the vinculum. The aedeagus (*ae*) consists of a strongly chitinised trulleum, which forms a floor to the membranous penis, the trulleum emitting a recurved pointed apical process. In *Ogygioses* the eighth abdominal sternite (*8S*) is not modified; the tegumen (*tg*) is membranous, narrow, curving downwards between the harpes, framed with a strip of chitin laterally, and laterally connected with the aedeagus by membrane; the vinculum (*vn*) is short, but strongly chitinised, with a ventral plate (*vp*) from the proximal margin directed caudally, the hind margin being emarginate, a structure that indicates affinity to *Anomoses*. The harpes (*har*) are large, broad, flattened, and not divided, apex elliptical; they differ little from those in

Anomoses except that in the latter the apex is produced into a point. The juxta (*jx*) is an oblong, thinly chitinised plate, somewhat thickened along median line, situated on the meson directly caudad of the vinculum and between the base of the harpes; it is similar to the same structure in HEPIALIDAE, PROTOTHEORIDAE, and PALAEOSETIDAE. The aedeagus (*ae*) is represented by a trulleum, which is a recurved chitinised process, channelled and tapering towards the pointed apex, and articulated to the caudal margin of the juxta; this structure indicates relationship to *Palaeoses*; there is no strong difference between the two species described in this paper.

The genitalia of both the Oriental genera are almost of the same type in the membranous tergite, the lateral frame of chitin, the thinly chitinised elongate juxta, and in the structure of the aedeagus which is recurved, hinged at the distal margin of juxta, with pointed apex; but there are remarkable differences present in the ventral plate of the vinculum.

LETTERING OF FIGURES.

1A first anal vein.
ae chitinised portion of aedeagus, or trulleum.
Ant basal segment of the antennae, or scape.
at anterior tentorial pit.
Clp clypeus.
Cu_1, Cu_2 two primary branches of cubitus.
Cu_{1a}, Cu_{1b} the secondary branches of Cu_1.
cu–a cubito-anal cross-vein.
E compound eye.
Ge gena.
har harpes or gonostyles.
hm humeral veinlet.
im intermedian cross-vein.
jl jugal lobe.
jx juxta.
lp labial palpus.
M_{1-4} branches of media.
Mx maxilla.
Pge postgena.
pm prementum.
pt pterostigma.
R_1 primary branches of radius.
R_{2-5} branches of radial sector.
R_s radial sector.
r–m radio-median cross-vein.
8S eighth abdominal sternite.
tg tegumen.
vn vinculum or ninth abdominal sternite.
vp a ventral plate detached from vinculum.

SUMMARY.

The two purely Oriental genera described above are distinguishable from Hepialid genera by the absence of any special structure in the antennae, and from Prototheorid genera by having shorter antennae with fewer segments; affinity is shown with *Palaeoses* in the obsolete maxillae, PROTOTHEORIDAE being very different in having the maxillae, haustellum and palpi well developed. Further affinity with PALAEOSETIDAE is shown in the wing-structure, vein M_{1+2} being quite eliminated, in which respect they differ again from HEPIALIDAE and PROTOTHEORIDAE. The legs differ from those of any PROTOTHEORIDAE, but resemble the legs of PALAEOSETIDAE in the absence or marked reduction of the tibial spurs.

It is in the genitalia, however, that the most peculiar features are exhibited. The structure of the juxta and aedeagus indicate some affinity of both genera with *Palaeoses*, but the structure of the harpes and tegumen do not bear this out; in *Ogygioses*, however, the vinculum and harpes show some similarity of structure with those structures in *Anomoses*. Both *Genustes* and *Ogygioses* differ greatly in the structure of every part of the genitalia from the African genera of the

Prototheoridae. At the same time, whilst on the evidence of the genitalia we cannot deny the existence of Palaeosetid features, in the present state of our knowledge too much stress must not be laid on such indications. As Philpott has already pointed out, the characters of the male genitalia must be used with the greatest caution for the purpose of grouping families and genera. For this reason we have chosen merely to record our observations without attempting to draw conclusions. Until more material becomes available, we would do no more than suggest that in our opinion *Genustes* and *Ogygioses* do not constitute a separate family but should be included in the Palaeosetidae rather than in the Prototheoridae or Hepialidae.

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EINE NEUE RELIKT-FORM DER GATTUNG *CICINDELA* AUS DEM SÜDEN VON VORDER-INDIEN

Von Dr. Walther Horn.

(*Berlin-Dahlem.*)

Cicindela pseudodromica, sp. n.

C. westermanni, Schaum, valde affinis; differt labro (parte basali variabiliter late testacea excepta) obscure-aenescente; superficie capitis prothoracisque regularius rugata; elytris lateraliter minus declivibus, discoidaliter paullo minus convexis, postice minus breviter rotundatis paulloque magis prolongatis (apice singulo evidenter magis rotundato-truncato!); parte illa laterali sat lata subnitente (in *C. westermanni*) ab humeris usque ad maculam ante-apicalem prolongata angustiore brevioreque et in media elytrorum longitudine disparente. Signatura: linea altera fere recta modice lata sat longa juxta-marginali pone humeros incipiente et fere usque ad mediam elytrorum longitudinem ducta, altera simillima ante-apicali pone mediam elytrorum longitudinem incipiente; macula parva rotundiformi discoidali pone medium sita.

Long. 11–11½ mm. (sine labro).

2 ♀. Trichinopolis: Mudukolam. Die beiden Exemplare sind im September 1931 von einem Sammler des Government Entomologist, Coimbatore (P.S.N.)

Fig. 1.—Left elytron of *Cicindela pseudodromica*, sp. n.

gesammelt und mir vom Imperial Institute of Entomology übersandt worden, dem 1 Exemplar von mir zurückgesandt worden ist.

Diese neue Art erinnert sehr stark an *C. westermanni*, Schm., und weiterhin an *C. grossula*, m., und *C. crassipalpis*, m.; eine gewisse Aehnlichkeit ist aber auch bezüglich der sonst so isoliert stehenden *Apteroessa grossa*, F., nicht zu verkennen. Diese 4 Arten sind nach meiner Ueberzeugung als Relikt-Formen zu deuten. Jetzt kommt eine 5te verwandte Art hinzu und dürfte es kein Zufall sein, dass auch diese wieder in ein und demselben kleinen umschriebenen Gebiet von Süd-Indien lebt. Interessant ist weiterhin die äussere Aehnlichkeit, welche zwischen mancher dieser Arten und süd-afrikanischen *Dromica*-Formen besteht, nicht nur in der Zeichnung, sondern auch in der Gestalt etc.; wenn auch die Episternal- und Epimeral-Bildungen von Mittel- und Hinterbrust grundverschieden sind.

Der laterale Winkel am Seitenrand der Oberlippe (nahe dem am meisten basal gestellten juxta-marginalen "fixierten" Haar) tritt bei der neuen Art deutlicher als bei *C. westermanni* hervor. Die Flügeldecken der neuen Art sind im allgemeinen gleichmässiger dunkler velours-artig gefärbt. Die grösseren Gemmen, welche bei der Schaum'schen Art nicht nur neben der Naht, sondern auch auf der Scheibe der Flügeldecken stehen, sind bei der neuen Art nur in Form einer juxta-suturalen Grubenreihe vorhanden, deren einzelne Gruben wesentlich kleiner sind als bei *C. westermanni*.

NOTES ON THE GENUS *COMPSORHIPIS*, SAUSS. (ORTHOPTERA, ACRIDIDAE)

By G. Beĭ-Bienko.

The genus *Compsorhipis* was established by Saussure in 1889 for a single species that had been described by the same author from the vicinity of Peking, China, in 1888, under the name *Callirhipis*, which is preoccupied in Coleoptera by Latreille's genus.

Since Saussure's description, the species has only been recorded by Bolivar, from Transbaikalia and Mongolia, although the genus is widely distributed there and in adjacent regions. In the present paper a second species is described, and this, like the genotype, strongly resembles the representatives of the allied genus, *Bryodema*, Fieb., in general habitus and coloration.

Compsorhipis; Saussure.

1888. *Callirhipis*, Saussure, Add. Prodr. Oedipod., p. 66 (*nec* Latreille).
1889. *Compsorhipis*, Saussure, Mitt. Schweiz. Ent. Ges., **8** : 87.
1904. *Cosmorrhipis*, Jacobson, Priamokr. Lozhnos. Ross. Imp., p. 267.
1910. *Compsorhipis*, Kirby, Syn. Cat. Orthopt., **3** : 262.

Representatives of the genus *Compsorhipis* resemble in general habitus those of the genus *Bryodema* on the one hand and the larger and more robust species of the genus *Sphingonotus*, Fieb., on the other.

It is easily distinguished from either genus, particularly by the structure of the hind tibiae. The latter are characterised by the presence of 13–17 spines on the inner side and of 10–17 spines on the outer; the interspace between the inner spines is shorter than the spines themselves. Elytra very broad, loosely reticulated. Pronotum with a very fine median keel, interrupted between transverse sulci. Body fully winged in both sexes, with dense hairs, especially on the legs.

1. *Compsorhipis davidiana* (Sauss.).

1888. *Callirhipis davidiana*, Saussure, Add. Prodr. Oedipod., p. 67 [♂, ♀; Peking, N. China].
1889. *Compsorhipis davidiana*, Saussure, Mitt. Schweiz. Ent. Ges., **8** : 87.
1901. *Callirhipis davidiana*, Bolivar *in* Zichy, 3 Asiat. Forschungsr., **2** : 226 [Ust-Kjahta (Transbaikalia); Tugurjuk (between Urga and Kalgan, Mongolia)].
1907. *Cosmorrhipis davidiana*, Jacobson, Priamokr. Lozhnos. Ross. Imp., p. 268.
1910. *Compsorhipis davidiana*, Kirby, Syn. Cat. Orthopt., **3** : 262.

Geographical distribution. From Southern Transbaikalia and Northern Mongolia on the north to Southern Mongolia and Yan-su province, N.W. China, on the south and Northern China (Peking) on the south-east.

Specimens examined :—

Southern Mongolia.—Alashan desert, South Gobi, ix.1901, 1♂, 1♀ (*P. Kozlov*); Dyn-yuan-in, Northern Alashan, 18–20.vi.1908, 2♂♂ (*P. Kozlov*). First record from S. Mongolia.

N.W. China.—Prov. Yan-su, 8.x.1871, 1♂ (*N.M. Przhewalsky*); Daho, Lan-chou, prov. Yan-su, elev. 1700 m., 19.x.1930, 1♂, 1♀ (*Beik*). First record from Yan-su.

2. **Compsorhipis bryodemoides,** sp. n. (Fig. 1.)

♂. Superficially very similar to a male of *Bryodema semenovi*, Ikonn., and especially to its Mongolian subspecies *orientale*, B.-Bienko; smaller than *C. davidiana*, Sauss., body more slender. *Antennae* long, a little longer than head and pronotum together; facial subocular keels practically straight; frontal sulcus with parallel keels, feebly sulcate, constricted

above and not reaching the clypeus. Eyes practically spherical, nearly as long as subocular space. Vertex sloping, as broad as the vertical diameter of the eye. *Pronotum* with cylindrical prozona, the latter distinctly constricted; metazona twice as long as prozona, practically without lateral keels but with distinct shoulders, forming with lateral lobes an angle of about 90°; surface of metazona with very fine rugosities; hind angle rectangular, not rounded; median keel very feeble, practically absent in metazona, intersected by three transverse sulci in prozona. Lateral lobes quite vertical, with straight anterior and hind margins; vertical depth of lobes somewhat greater than dorsal length of the same. *Elytra* broad, extending a little beyond the apex of hind tibiae; scapular area in the apical half

Fig. 1.—*Compsorhipis bryodemoides*, sp. n., dorsal view of male type.

with regular transverse veinlets; mediastinal area not broader than the scapular; discoidal area with very dense and fine irregular veinlets; discoidal vein S-shaped incurved, parallel to hind radial; first ulnar vein strongly incurved near the middle of basal half of elytra; venation of elytra not so dense as in the genotype. *Wings* elongated; apices of the first and second lobe prominent; discoidal area twice as broad as the interulnar; ulnar veins parallel in basal third, then somewhat divergent, and feebly convergent near the base of apical quarter. Hind tibiae densely pilose; outer upper margin with 12–13, inner margin with 16–17 spines. Prosternum with very distinct but not strong, moderately acute triangular projection. Interspace between mesosternal lobes scarcely broader than long, practically quadrate.

♀. As the male, but more clumsy. *Antennae* as long as the head and pronotum together. Hind margin of the pronotum a little more than 90°. Elytra only reaching the apex of hind tibiae; anterior margin feebly incurved in basal half, practically without excision;

scapular area with dense irregular veinlets. *Wings* and hind legs as in the male. Interspace between mesosternal lobes half as broad again as long. Valvae of the ovipositor feebly incurved; lower pair practically without preapical excision and without a tooth. *Coloration* greyish or brownish-grey. Head bluish-grey; antennae light brownish, with dark rings. *Elytra* somewhat transparent, especially in ♂, with darkened basal third; other parts unicolorous or median part with incomplete transverse fascia and apex with darkish spots. *Wings* with very broad dark transverse fascia; first lobe dark except light apical third; apices of the second, third and fourth sectors not darkened, pellucid; or sometimes apices of the first and second sectors with a dark spot on each lobe; basal part of wings bright rose, occupying one-fourth part of the second and one-third part of third sectors; hind part of the external margin of wings from sixth sector occupied by external margin of dark transverse fascia; the boundary between basal rose part and dark transverse fascia sharp; transverse veinlets in the basal rose part of wings, not darkened, dirty rose. Hind femora without distinct dark fasciae on the outer side; lower and inner sides black, except yellowish apical fourth; hind tibiae dirty yellow, with very fine orange-rose shade on the inside; sometimes outer side bluish-grey; apex of the basal third without sharp, dark ring.

Lower surface of the body greyish-yellow.

	♂ (type)	♀
Length of body	24·5 mm.	33·0 mm.
,, ,, pronotum	5·8 ,,	7·8 ,,
,, ,, elytra	28·0 ,,	31·5 ,,
,, ,, hind femora	11·0 ,,	14·0 ,,

Central Mongolia.—Middle reaches of R. Tuin-gol, Halha, 28.vii.1926, 1♂ (type), 1♀ (*A. N. Kiritshenko*); valley of Tuin-gol near Orok-nor, 2.viii.1926, 2♂♂ (*A. N. Kiritshenko*); lower reaches of R. Baidarik, 30.viii.1926, 1♀ (*A. N. Kiritshenko*); N.W. Mongolia, Malyi Namir, 11.viii.1911, 1♀ (*K. Jurganova*); S. Mongolia, Dzhargalante-Etzsingol, Alashan, 21.vii.1909, 1♀ (*P. K. Kozlov*).

This beautiful insect is very similar to the male of *Bryodema semenovi orientale*, B.-Bienko, in practically all specific features, such as dimensions, general habitus, structure of the head and pronotum and coloration of the body and wings. It is very interesting that both species inhabit practically the same area in Mongolia, and some specimens of both sexes were secured by Mr. A. N. Kiritshenko at practically the same place.

Much the same morphological parallelism is observable between the other species of the genus *Compsorhipis*, viz. *C. davidiana*, and *Bryodema uvarovi*, B.-Bienko (see my monograph of the genus *Bryodema* in 1930, *Ann. Mus. Zool. Acad. Sci.*, Leningrad, **31** : 113). The range of these two species differs more than in the case of *C. bryodemoides* and *B. semenovi orientale*, but both are known from Yan-su province, N.W. China.

The two representatives of the genus *Compsorhipis* may be distinguished by the following key :—

1(2). Larger. Prosternum with an obtuse rounded projection. Scapular area of male elytra with irregular transverse veinlets. Wings with a very gradual transition from the basal red part to the dark fascia; basal red part very small, not occupying the bases of the second and third sector, with blackened transverse veinlets . . . 1. *C. davidiana*, Saussure.

2(1). Smaller. Prosternum with moderately acute triangular projection. Scapular area of male elytra with regular transverse veinlets. Wings with a sharp boundary between the basal red part and dark fascia; basal red part relatively large, occupying bases of the second and third sectors, with transverse veinlets not blackened, rose.

2. *C. bryodemoides*, sp. n.

THREE NEW BRACONIDS (HYM.)

By D. S. Wilkinson,
(*Imperial Institute of Entomology.*)

Cenocoelius paraguayensis, sp. n.

♀. Black; head (except for the excavate area on the frons, vertex, and median occiput), the prothorax, the entire mesopleurae and mesosternum usually (but not always), portions of the mesonotum occasionally (particularly the median lobe), the disc of the scutellum (and sometimes its lateral faces with the crenulations), the tegulae, the front legs (except for their tarsi), the middle femora commonly (but more rarely the middle coxae or middle tibiae), red testaceous; the propodeon entirely (save for the apical two-thirds of the median half of the basal horizontal portion), large portions of the hind coxae, the pleurites and ventrites of the abdomen, and the 3rd tergite in at least its basal fourth, pale to white; ovipositor dark brown-red; wings strongly infumated; stigma and wing-veins reddish-brown.

♀. *Head* broader than the thorax; face and clypeus with distinct, fairly close punctures, the remainder of the head smooth and shining with only sparse punctation; facial depressions considerably nearer to each other than to the eyes; the greatest length of the eyes equal to the malar space; a deep depression occupies the median longitudinal half of the frons and vertex, extends from the base of the antennae virtually to the occipital carina, is strongly margined laterally from the antennae to just beyond the posterior ocelli (the posterior ocelli being situated actually on the carina), and has anteriorly in the middle a short, narrow, high, posteriorly truncate ridge; the vertex posteriorly to the posterior ocelli, on each side between this depression and the eyes, swollen; posterior ocelli considerably nearer to the eyes than to each other, and the three ocelli almost in line; flagellum with 30–32 joints; the large joint of the scape just shorter than the combined length of the two basal joints of the flagellum. *Thorax:* mesonotum short, shorter than the apical breadth of the 1st tergite, smooth and with only very widely separated, weak punctures; the notauli very strong and very strongly crenulate; the disc of the scutellum virtually entirely smooth; the propodeon coarsely reticulate. *Wings:* the 2nd cubital cell narrowed apically, but somewhat variable in shape, the 2nd abscissa of the radial almost invariably distinctly longer than the 2nd transverse cubital, and this latter slightly longer than or equal to the 1st abscissa of the radial; stigma as long as the metacarp. *Legs:* the hind tibiae not unduly thickened. *Abdomen:* all tergites smooth save for a deep elongate fovea on each side of the extreme base of the 1st, these giving rise to certain smooth, longitudinal carination or rippling, and creating a raised median area; 1st tergite with sides strongly diverging in the basal half, more approaching parallel in the apical half, the apex straight, the median length about 1·2 times the apical breadth, this latter about three times the basal breadth of the 1st tergite and twice the median length of the 2nd tergite; the 2nd suture strongly bisinuate; ovipositor sheaths about as long as the combined length of the head, thorax, and abdomen.

Length, 9 mm.

Paraguay: San Bernardino, 6 ♀♀, undated.
Type in the British Museum.
Host unknown.
This species does not agree with any published description.

Cenocoelius eous, sp. n.

♀. Black; antennae (except at least the apical half of the flagellum, which is brown), all femora at apex, the four anterior tibiae, the hind tibiae at base, all tarsi (except the "feet"), red testaceous; the femora and the hind tibiae otherwise darkened in varying degrees of red-brown to black; ovipositor red; wings very faintly infumated; stigma and wing-veins brown.

♂. Black; antennae (except the apex of the flagellum, which is brown), all legs (except the "feet" and the coxae), red testaceous; coxae, particularly the four anterior, often reddish; wings very faintly infumated; stigma and wing-veins brown.

♀♂. *Head* broader than the thorax; face and clypeus with distinct, fairly close punctures, the remainder of the head smooth and shining with only sparse punctation; facial depressions considerably nearer to each other than to the eyes; the greatest length of the eyes greater than the malar space; a deep depression occupies the median longitudinal third of the frons, extends from the base of the antennae to the ocelli, is margined laterally from the antennae to in line with the anterior ocellus, and has anteriorly in the middle a short, narrow, high, posteriorly truncate ridge; the anterior ocellus lies just inside this depression; frons and vertex otherwise evenly rounded; posterior ocelli about equidistant from each other and the eyes or rather nearer to the eyes; flagellum with 24–28 joints; the large joint of the scape longer than the combined length of the two basal joints of the flagellum. *Thorax:* mesonotum short, shorter than the apical breadth of the 1st tergite, smooth and with only minute punctation; the notauli well marked and crenulate; the disc of the scutellum virtually entirely smooth; the propodeon coarsely reticulate. *Wings:* the 2nd cubital cell rarely noticeably narrowed apically, variable in shape, the 2nd abscissa of the radial varying from slightly shorter than, to very definitely longer than, the 1st abscissa of the radial; stigma as long as metacarp. *Legs:* the hind tibiae very noticeably thickened in the apical three-fourths. *Abdomen:* all tergites smooth save for a deep fovea on each side of the extreme base of the 1st, these creating a raised median area which has some weak defining carination; 1st tergite with sides strongly diverging, but towards apex slightly rounded and approaching parallel, the apex straight, the median length in the ♀ apparently hardly longer than 1·15, in the ♂ 1·2–1·3, times the apical breadth, this latter in the ♀ approaching three times, in the ♂ quite three times, the basal breadth of the 1st tergite and in the ♀ 1·5 times, and in the ♂ at most 1·2–1·3 times, the median length of the 2nd tergite (the relative lengths of these parts, however, variable); the 2nd suture straight; ovipositor sheaths about as long as the abdomen.

Length, 3·0–4·5 mm.

India, United Provinces: Lachiwala, Dehra Dun, 2 ♀♀ (one the *type*), 5 and 7.vii.1930 (*J. C. M. Gardner*); Jhajra, Dehra Dun, 1 ♀, 1 ♂, 16.vii.1930 (*J. C. M. Gardner*); Hardwar, Saharanapur, 3 ♀♀, 25.vii.1930, 5.viii.1930 (*R. N. Mathur*); Asan Range, 5 ♂♂, 4–20.vii.1929 (*M. Bose*).

Type deposited in the British Museum.

Host. The specimens from Lachiwala are labelled "*ex* dry stems"; those from Jhajra, "ex *Flemingia stricta*"; those from Hardwar, "ex *Dalbergia sissoo* twigs"; and those from the Asan Range, "ex *Ougeinia* [sic] *dalbergioides.*"

This species does not agree with any published description. It is very much like *agricolator,* L., and *analis,* Nees, as represented in the British Museum collections, but differs noticeably from the former in its swollen hind tibiae and its elongate scape, and from the latter in its shorter mesonotum and larger head.

Microgaster sons, sp. n.

♂. Black; large portions of the scape, the four anterior legs (except the middle coxae basally and above), the hind trochanters and trochantines, the basal three-fourths of the hind femora, an annulus occupying the apical two-thirds of the basal half of the hind tibiae, the tegulae, wing insertions, and costal veins of both fore- and hind-wings basally, red testaceous to red; the basal three-fifths of the 1st tergite, the 2nd tergite (except the median third of about the apical two-fifths), and the basal half of the venter, pale reddish; palpi and tibial spurs pale; stigma and wing-veins brown, the stigma opaque; wings hyaline, infumated at apex from shortly before the termination of the metacarp.

♂. *Head* indefinitely roughened; clypeus not differentiated from the face; facial depressions rather nearer to apex of clypeus than to the eyes; the posterior ocelli nearer to the eyes than to each other. *Thorax:* mesonotum with strong, more or less contiguous punctation; disc of scutellum with rather stronger punctation than on the mesonotum, and more widely spaced, the interspaces with some evidence of minute aciculation; the

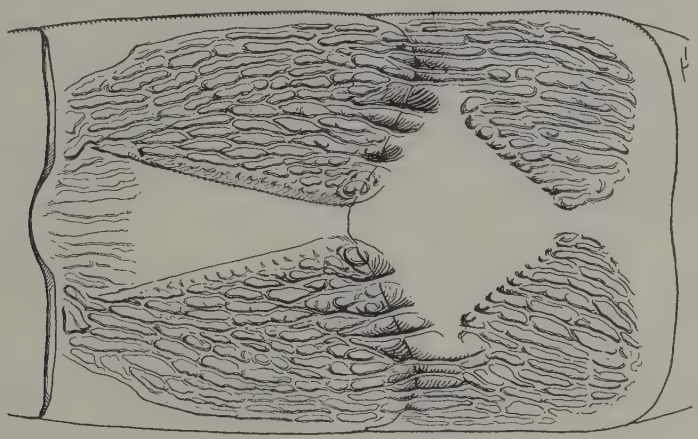


Fig. 1.—*Microgaster sons*, sp. n., dorsal view of 2nd and 3rd tergites.

scutellar sulcus straight and strongly crenulate; the mesopleural sulcus elongate, broad and shallow; propodeon shining, not strongly punctate, with a strong median longitudinal carina which has long crenulation on each side of the apical half. *Wings:* the 1st transverse cubital equal to the apical portion of the 1st abscissa of the cubital, longer than the recurrent, shorter than the 1st abscissa of the radial, with which latter it is only weakly angled; the minute, hyaline, 2nd transverse cubital received into the 1st transverse cubital just below its centre, at which point the 1st transverse cubital is weakly angled, the upper portion of this latter vein being shorter than the pigmented portion of the 2nd abscissa of the cubital and half the length of the 1st abscissa of the radial, which is shorter than the breadth of the stigma; upper portion of basal vein equal to lower portion of the 1st transverse cubital; stigma shorter than metacarp. *Legs:* hind coxae on outer faces and above with a mixture of strong and minute punctures, the apical third rugose; the longer hind tibial spur about three-fourths, and the shorter spur rather more than half, the length of the basal joint of the hind tarsus. *Abdomen:* 1st tergite with the lateral margins diverging and more or less straight, the truncate apical margin about three-fourths the median length (34 : 40), the tergite with a strong median longitudinal sulcus from base to near apex where

it bifurcates into a considerably weaker, crenulate sulcus extending on both sides across the apex of the tergite; the tergite thus divided into two portions, of each of which the outer apical angle is weakly, and the inner angle strongly, rounded; the apical two-fifths of the tergite rugoso-punctate, the basal three-fifths nearly smooth; immediately posteriorly to the apical bifurcation of the median sulcus, and formed by this bifurcation and the apex of the tergite, is a smooth lunule; 2nd tergite (fig. 1) with the lateral margins straight, parallel, and decidedly shorter than the breadth of the tergite (26 : 36), apically the tergite emarginate and bisinuate, so that its median length is rather shorter than its lateral length, and this latter shorter than the greatest length (25 : 26 : 30), which is very near the lateral margin; the integument decidedly more weakly sculptured than that of the apex of the 1st tergite, striato-punctate, save for the middle-field which is entirely smooth except for some weak striation at extreme base; the middle-field extends throughout the length of the tergite, and basally occupies the median third of the tergite, its nearly straight sides strongly converging so that its apical breadth is about one-third its basal breadth, and strongly delimitated laterally by a virtually smooth sulcus, which latter apically joins with the 2nd suture and basally joins with a weakly crenulate sulcus that continues on outwards round the base of each lateral third of the tergite; 2nd suture strongly crenulate; 3rd tergite with median length equal to that of the 2nd, its lateral length much shorter than that of the 2nd, apically very slightly emarginate, with its apical angles rounded, its integument striate (except narrowly across the apex, more broadly medianly at apex, and for the smooth middle-field); the middle-field large, somewhat convex, highly polished, basally occupying two-thirds of the base of the tergite, its straight lateral margins however strongly converging so that its median length is also about two-thirds that of the tergite (17 : 25), delimitated laterally by weak, somewhat crenulate sulci that do not meet at extreme apex.

Length, 3·3 mm.

Australia: Brindabella F.C.T., about 4,000 ft., 1 ♂, 23.iii.1930 (*J. W. Evans*, through *L. F. Graham*).

Type returned for deposition in the National Collection of Australia.

Host unknown.

Cocoons unknown.

This new species is closely related to *M. basimacula*, Cam., and *M. integra*, Wilkn.; but there are numerous characters to distinguish it, and of these, probably the most striking is the shape of the middle-field of the 3rd tergite.

A NEW SPECIES OF *CAMPONOTUS* (HYM., FORMICIDAE) FROM COLOMBIA

By Horace Donisthorpe, F.Z.S., F.E.S.

Camponotus (Myrmobrachys) cheesmanae, sp. n.

♀. The greater part of the head including the jaws (except the teeth, which are black), clypeus, cheeks, and part of the underside, straw colour, the occiput of the head is black, and the black colour extends to vertex, reaching the hind borders of the eyes (which are black in some specimens and white in others, the latter having probably faded after death) and extending in a triangular patch as far as the centre of the head. The frontal area is black and the clypeus and frontal carinae are narrowly bordered with black. Beneath the head a black band extends along the gula as far as the mouth-parts. The thorax, petiole, and scale are black, the narrow border of the pronotum being translucent. The

gaster is yellow with a black stripe and a straw-coloured margin at the apex of the segments. The antennae and part of the legs are yellow, part of the femora, tibiae and tarsi of the two posterior pairs of legs being black. Head closely and finely punctured, more strongly on the vertex with some large longitudinal shallow punctures behind, and smaller round scattered punctures on the cheeks. The finer punctures gradually fade away on the cheeks and occiput, which are shining and almost smooth. The front part of the head is furnished with short, little, yellow club-shaped hairs; a few scattered fine erect hairs, which also occur on the scapes of the antennae, and some very short decumbent yellow hairs, especially behind the eyes, are also present. The thorax is sharply, deeply, and very closely punctured, the borders of the punctures being raised; the pronotum is furnished with short, pale, decumbent hairs directed forwards, and the whole thorax possesses long erect, scattered, darker hairs. The scale of the petiole is transversely striate in front and behind. The gaster is dull, scarcely perceptibly punctured, and a few scattered erect hairs and very short, decumbent, yellow hairs are present.

♀. *Head*, broad, truncate in front; *mandibles* massive, very finely punctate and striate, with 5 strong teeth gradually lengthened to apex; *clypeus* large, triangular, flat, but with a strongly raised carina, the anterior border somewhat uneven and almost on a level with the anterior borders of the cheeks; *frontal area* distinct; *frontal carinae* short, widely separated, with strongly raised rims; *antennae* inserted considerably before the middle of the frontal carinae, moderate, *scape* curved, and if viewed in profile scarcely reaching beyond the posterior angles of the head; *frontal furrow* shallow and broad, but not very distinct; *eyes* large, round, set rather far back. *Thorax* with dorsal surface continuous, and somewhat flat; *pronotum* margined, with distinct but rounded shoulders; *mesothorax* with dorsal surface rounded in front and straight behind, *pro-mesonotal suture* very distinct, the *episternite* of the mesothorax is widely separated from the pronotum; the *meso-epinotal suture* is well marked, the dorsal surface of the *epinotum* is rounded at the sides, and is shorter than the declivity, which is somewhat steep; the *scale* of the *petiole* is convex in front and flat behind, and the sharp upper edge is slightly emarginate. *Gaster* moderate, longer than broad with the first four segments of about equal length. *Legs* moderate, posterior *femora* curved, *tibiae* compressed. *Long.* 7·4–7·9 mm.

☿. The worker is similar to the soldier in general colour, puncturation, and pubescence, etc., but differs in the following points :—The antennae are darker and the funiculus towards the apex is almost black; the head is chiefly black, only the jaws (except the teeth), clypeus and anterior parts of the cheeks being straw coloured. The head is longer and narrower, the clypeus is more convex, the anterior border more even and the carina much less raised; the eyes appear to be more prominent as they are situated at the extreme sides of the head. From the posterior margin of the eye the head is quite straight to the rounded posterior angles, and the temples are hollowed out causing a ridge or border between the upper and lateral surface of the head. The antennae are longer and the scapes extend beyond the posterior angles of the head by quite half their length. *Long.* 5·9–6·8 mm.

Described from three soldiers and twenty-eight workers taken by *Miss L. E. Cheesman* (in honour of whom this species is named) on Gorgona Island, Colombia, 2·59 N., 78·20 W., in October 1924. The types are in the British Museum Collection.

This very beautiful species belongs to the *dimorphus* group of the subgenus *Myrmobrachys*, all the species of which occur in Central and South America. *Camponotus* (*Myrmobrachys*) *championi*, Forel, from Mexico and Panama, also a member of this group, has a somewhat similar style of colouring, but the puncturation is very different, the thorax being smooth and shining, etc.

SOME COCCOPHAGOUS PSOCIDS (PSOCOPTERA) FROM EAST AFRICA

By J. V. Pearman, F.E.S.

Among a number of Psocids sent from Kenya Colony to the Imperial Institute of Entomology are some recorded as being predacious on *Pseudococcus citri*, Risso, and I am indebted to Sir Guy A. K. Marshall for the opportunity of examining them.

Hitherto the activities of certain species have tended to give Psocids rather an ill reputation, but the labelling of the Kenya species suggests that some, at least, may engage in economically useful practices. With regard to their mode of life, the higher Psocids may be classed as either "corticolous" or "folicolous." The corticolous species pass their whole lives on tree-trunks or rock surfaces, subsisting mainly on *Pleurococcus* and algae; the folicolous species dwell among, and find their food upon, the leaves of trees and shrubs or, less frequently, on rough herbage (lucerne, sedge, etc.). The Coccid-eaters belong to the second category, the members of which are particularly adapted to their habitat by being equipped with a sucker-like empodium to each claw, whereby they are enabled to maintain a foothold upon, and to move actively over, a perfectly smooth surface, on which the bark species are helpless.

It does not appear to have been certainly established what forms the natural food of the foliage species. The assumption is that it consists of micro-fungi, but thriving individuals are commonly found on leaves bearing no indication of fungal or algal infestation. This fact led Ludwig * to suggest that secretions from trichomes were eaten. Hubbard † regarded the food of '*Psocus*' *citricola*, Ashm., as consisting of "the wax and other soft excretions of Bark-lice, of honey dew, and probably also of minute fungi or their spores which germinate on leaves and bark infested with insects." From my own experience I have found that it is impossible to rear such insects on *Pleurococcus*, that they appear to nibble the surface of fresh leaves, and that many readily eat insect eggs.

A propensity towards entomophagy gives these Psocids some claim to consideration as helpers in keeping other, undesirable, insects in check. Probably their usefulness is limited to the destruction of insect eggs and such small sedentary creatures as Coccids—perhaps also Aphids, and though they are unlikely to be potent against well-established pests they may be often successful in overcoming them at the onset of an attack. Hubbard called Psocids "bark cleaners"; the foliage species could appropriately be termed "leaf cleaners." It is to be reckoned in their favour that they are not dependent entirely upon animal food, for they will not die off when that is exhausted, and since they do no appreciable damage to the foliage of their habitat, they can be left in possession of the field to stem any attempted invasion by plant-feeding insects. Most of them have at least two broods annually, and as the nymphs have the same tastes as the imagines, a species would have an effective period of about six months. They are fairly prolific, the progeny of a single female averaging round about twenty, but they are themselves liable to attack —chiefly in the egg stage—from Mymarids, Hemiptera, mites, and even from their own kind.

* 1908, "Zur Biol. d. *Stenopsocus stigmaticus*," *Stett. Ent. Ztg.*, **69** : 197, 198.

† 1885, "Insects affecting the Orange," U.S. Dept. Agric. Div. Ent., pp. 193–196.

The Coccid-eating Psocids from Kenya all belong to that large family the CAECILIIDAE, which is typical of the folicolous group. They were collected by Mr. T. W. Kirkpatrick. Of the eight species represented, seven are new, one typifying a new genus. Types of all the species have been deposited in the British Museum.

In the descriptions that follow, the abbreviations used in connection with the venation are explainable by reference to p. 95; the position of the radial furcation is located by an imaginary line (rf perpend) dropped from the common base of r_{2+3} and r_{4+5} perpendicularly to the line of greatest wing-length, and passing through some part of the median-vein system. It should be noted that in all the species the ciliation of the veins is arranged in a single row and that the marginal ciliation of the hind-wings commences at the termination of r_1 on the fore margin.

1. **Ypsiloneura,** gen. n. Genotype *Y. kirkpatricki,* sp. n.

Belonging to the CAECILIIDAE. Particularised by the venational pattern, viz. Media two-branched only (m_2 wanting), *PS* with short spur-vein. Mouth-parts of usual Caeciliid type. Tarsi two-segmented, claw simple without pre-apical tooth.

In the type species the wings are elongate and the legs extraordinarily long.

Allied to *Fulleborniella,* Endln., 1902, but in that genus the media is normal, three-branched.

The genera *Hemicaecilius, Mepleres* and *Scottiella,* Endln., also exhibit a two-branched media, but the missing vein appears to be m_3. In none of these genera is there a spur-vein to *PS*. The subfamily POLYPSOCINAE comprises forms with a reduced media correlated with other venational abnormalities.

Ypsiloneura kirkpatricki, sp. n.

Colour. Head deep red-brown, frons rather darker, clypeus pitchy-black, labrum pitchy-brown with blackish triangular area in basal half; eyes blackish; antennae with orange-yellow basal segments and blackish flagellum. Meso-thorax dark brown, meta-thorax lighter brown. Abdomen above light brown, beneath whitish, apex brown. Legs yellow, femora tinged orange, tibiae and tarsi greyish apically, claw black. Fore-wings hyaline marked with transparent brown as follows:—distal half of *PS* and around spur-vein, bordering radial and median-fork veins, whole space between median and cubital systems (including *AP*), a broad irregular band from radius to posterior margin passing across *r–m* junction, and the whole of cell *AX*. Of these markings the darkest are that in *PS* and a narrow bordering of the margin between m_3 and cu_1. Costa yellow (but brown where adjoining the brown markings), radius yellow up to dark part of *PS*, other veins brown. Hind-wings unmarked, veins *m* + *cu*, *cu*, and *ax* dark brown, others greyish.

Morphology. Head rounded, bearing short pale pubescence, median suture distinct and ending in a small oval (= atrophied ocellar tubercle), clypeus large and broad, labrum large with rounded anterior angles. Eyes distant from hind head margin, rather small, sub-spherically projecting, non-pubescent. Ocelli reduced to a minute dot at hind margin of frons. Antennae strong, first flagellar segment as stout as tibiae (remainder missing), with short bristly ciliation. Maxillary palpi missing; other mouth-parts much like those of *Caecilius fuscopterus,* Latr. Thorax and abdomen of usual form, both with short fine pubescence. Gonopophyses of modified Caeciliid form, sub-genital plate simple with broadly rounded margin. Telson lobes without spines, simply ciliated; paraprocts with

usual sense fields each composed of about 19 sensoria. Wings elongate, rather narrow. Fore-wings :—*PS* very long, its apex strongly expanded triangularly, with a short spur-vein; radial fork large, arms strongly diverging, r_{4+5} about as long as fork stalk, rf perpend passing some way in front of base of m_3; median fork large and wide, upper branch about twice as long as lower and about one and a half times the length of the fork stalk; *r–m* junction continued in a very long confluence; *AP* small, semi-elliptical; margin, *PS*, and all veins with short fine ciliation (especially delicate on analis). Hind-wings :—r_{2+3} nearly perpendicular to r_{4+5} and fore margin; *r–m* junction in a long confluence; veins bare, margin ciliated in a single row. Legs remarkably long and stout, femora not expanded, hind coxae without stridulatory structures (which are replaced by groups of micro-setae); ciliation short and fine. Hind tarsal segment I with a row of 25 ctenidiobothria. Fore-wing, 4·05 mm. Hind leg: femur, 1·5 mm.; tibia, 1·9 mm.; tarsus I, 0·6 mm., II, 0·15 mm.

Kenya Colony, Doonda, October 1925, 1 ♀ (*T. W. Kirkpatrick*).

The general colouring much resembles that of *Fulleborniella nyassica*, Endln., 1902.

2. **Caecilius pallidus,** sp. n.

Colour. Generally transparent bone-white with brownish tinges from subcutaneous tissues. Eyes plum-black (probably otherwise in life); frons brownish; clypeus with pale orange striations except on inferior surface; fore margin of labrum and distal segments of maxillary palpi brownish; antennae, tibiae and tarsi light brownish-yellow; hind coxal stridulatory organ brown. Fore-wings matt whitish; *PS* yellow; veins more or less yellow, the following brownish :—r_{2+3}, r_{4+5}, part of radial fork stalk, m_1, m_2, m_3, part of median stem, *cu*, cu_1, hind margin from m_2 to nodulus, and cell *AX*. (Mounted in gum-chloral the wing has a weak yellowish tinge with indications of faint margination about the darker veins.) Hind-wings hyaline, veins pale.

Morphology. Head elongate, median suture fine, frons small; clypeus broad; maxillary pick with narrow apex; antennae slender; eyes large and projecting; ocelli not discernible. Head and body with rather long, fine, pale ciliation. Wings large. Fore-wings :—*PS* elongate, narrow, slightly widened in apex, non-angulate; radial fork stalk twice length of r_{2+3} which is about three-quarters length of r_{4+5}, rf perpend passing nearly midway between bases of m_2 and m_3; *r–m* junction in a short confluence; *AP* small but elevated with rounded vertex; margin, *PS*, and veins (except analis) with rather short cilia. Hind-wings :—r_{2+3} nearly perpendicular to fore margin, *r–m* junction confluent; veins bare, marginal ciliation fine and not very long. Hind tarsal segments in ratio of $3\frac{1}{2} : 1$; basal segment with about 23 ctenidiobothria; claw not toothed, with some hairlets above at base. Fore-wing, 3·4 mm.

Kenya Colony, Doonda, January 1926. One example, sex uncertain, the large eyes suggest ♂ (*T. W. Kirkpatrick*).

In many respects there are resemblances to the characters of *C. basidentatus*, Endln., 1910, but the present species is rather paler throughout and differs by having the analis of the fore-wings non-ciliate and the claw non-denticulate.

3. **Caecilius signatipennis,** Endln., 1910.

Colour. Head brown with yellowish ill-defined areas between eyes; antennae brownish-yellow, distally greyish; eyes black. Mesonotum black, metathorax and abdomen light brown. Legs brownish-yellow. Fore-wings marked brown as figured (fig. 3), light portion of *PS* yellow, other pale areas with whitish sheen. Hind-wings tinged greyish but leaving

hyaline areas as follows :—cells r_1, r_{2+3} and part of r_{4+5}, a band from base of m to hind margin, and a small spot at end of an; r_{2+3} margined brown.

Morphology. Median suture of head distinct; frons rather small; eyes moderate; maxillary pick with broad apex (?—not well placed for observation); antennae about as long as wings, with short close pubescence. Head and body with short pale ciliation. Fore-wings :—*PS* subtriangularly expanded in apex with rounded vertex; radial fork short with strongly diverging arms, r_{2+3} about two-thirds length of r_{4+5}, latter about three-quarters length of radial stem, rf perpend passes nearly midway between bases of m_2 and m_3; *r–m* junction in a long confluence; *AP* elevated with rounded forwardly directed vertex; margin, *PS*, and veins (except analis) with short ciliation. Hind-wings :—r_{2+3} makes an angle of about 70° with r_{4+5}; *r–m* junction in a long confluence; veins bare, margin ciliated. Legs with rather close short bristly ciliation; hind tarsal ratio about 4 : 1. Fore-wing, 3·0 mm.

KENYA COLONY, Doonda, January 1926, 1 ♀ (*T. W. Kirkpatrick*).

The specimen, agreeing in the main with Enderlein's description, is rather larger than the type (also a female, fore-wing 2·8 mm.) and apparently differs slightly in some details.

4. **Caecilius ambiguus,** sp. n.

Colour. Head yellowish-brown, paler in front; palpi and antennae brown; ocellar tubercle and eyes black. Thorax brown. (Abdomen missing.) Legs light brown with yellow femora. Fore-wings light smoky-brown, rather darker in basal half, with some dark markings and faint pale areas; dark markings—central portion of *PS* and a streak below its vertex, margination of r_{2+3}, and a clouding about and behind the *r–m* junction, also some indication of clouding about other veins; pale areas—narrow border below *PS*, space between *PS* and *r–m* junction, about the basal half of m, about cu_a, and about nodulus. Hind-wings uniformly pale smoky.

Morphology. Head with well-defined median suture; ocelli on a large tubercle; eyes very large, each about twice the bulk of the clypeus; antennae a little longer than the wings, rather stout, with short bristly pubescence; pick with broad rounded apex. Hind tarsal segments in ratio of 4 : 1. Fore-wings :—apex relatively short and broad, *PS* with obtusely angled expanded apex; r_{2+3} converges slightly towards *PS* and is about three-quarters the length of r_{4+5}, latter nearly equal in length to fork stalk, rf perpend falling a little apicalwards of base of m_3; *AP* moderately elevated with rounded vertex; *r–m* junction in a long confluence; margin, *PS*, and veins (except analis) with fine ciliation. Hind-wings :—r_{2+3} leaving r_{4+5} at an angle of about 70°; *r–m* junction in a long confluence; veins bare, margin ciliated. Fore-wing, 2·7 mm.

KENYA COLONY, Doonda, January 1926, 2 ♂♂ (*T. W. Kirkpatrick*).

I feel some doubt whether this may not be conspecific with *inquinatus*, Endln., 1902, which was also described from a male. The latter was, however, considerably larger (fore-wing 3·5 mm.) and perhaps paler in colour. *C. ambiguus* appears to be closely allied to *signatipennis*.

5. **Caecilius obscurus,** sp. n.

Colour. Generally dark brown, femora yellow brown. Wings uniform grey-brown, veins and *PS* in fore-wings darker brown; faint indications of paler tint occur as a narrow border below *PS* and along some of the veins in the basal half of the wing, and as an oval area below the stigma-sac.

Morphology. Head with distinct median suture; ocellar tubercle large; eyes large, each in bulk about equal to clypeus, rather widely separated; antennae as long as wings,

stout with dense, bristly, but not long pubescence; pick with narrow apex. Head and body with fine ciliation. Tibiae with rather bristly ciliation; hind tarsus :—segment I with 25 ctenidiobothria, ratio of segments $3\frac{1}{3} : 1$. Fore-wing :—*PS* with obtusely angled expanded apex; radial fork long, arms lightly diverging, r_{2+3} running parallel with outer side of *PS*, three-quarters length of r_{4+5} and about as long as fork-stalk; rf perpend falling a little rearwards of base of m_3; *r–m* junction in a long confluence; *AP* moderately elevated, subtriangular with rounded vertex (in one specimen *AP* is reduced to tiny proportions); margin *PS* and veins (except analis) with short fine ciliation. Hind-wing :—r_{2+3} running steeply but not vertically to fore margin; *r–m* junction in a long confluence; veins bare, margin ciliated. Fore-wing, 3 mm.

Kenya Colony, Doonda, December 1925, January 1926, 2 ♂♂ (*T. W. Kirkpatrick*).

6. **Caecilius lucidus,** sp. n.

Colour. Generally whitish. Head white, marked pale grey-brown on vertex, beside eyes, and on frons, and darker brown about antennal toruli (♀); or unmarked, tinged very pale ochraceous (♂); ocellar tubercle reddish (♀) or pale (♂); antennae greyish-white (♀) or grey-brown (♂); clypeus with pale orange striations; eyes blackish (probably otherwise in life); mesothoracic lobes brown, broadly outlined white (brown colour more extensive in ♂); abdomen and legs whitish-ochraceous, claw black. Wings transparent colourless, veins mostly pale.

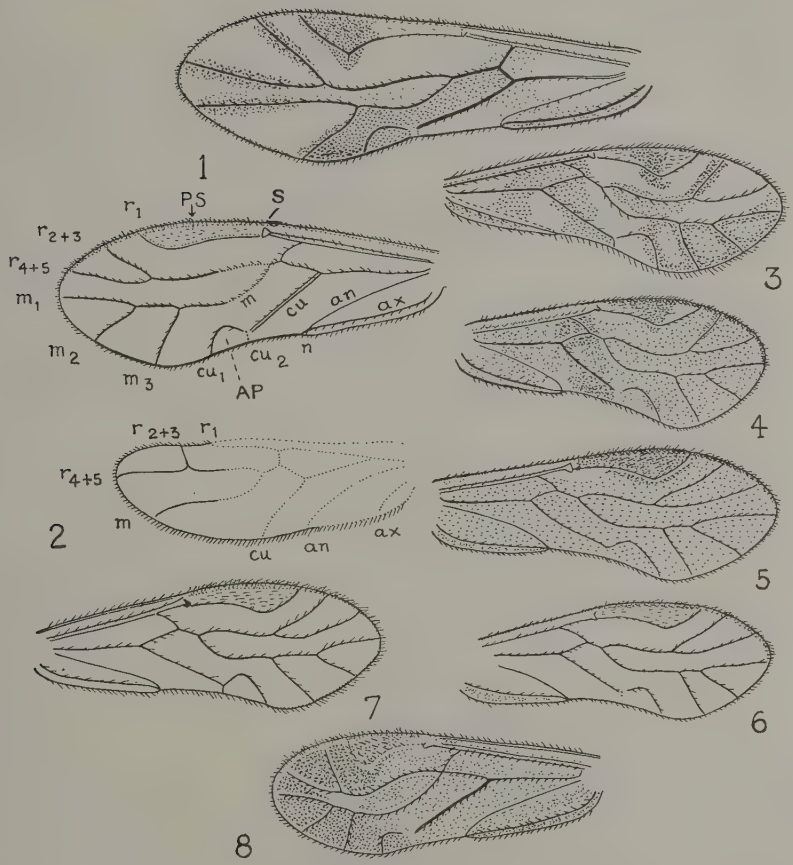
Morphology. Head with very fine median suture; ocellar tubercle not very large; clypeus large and broad; antennae fine, shorter than wings (♀), or long, stout and tapering (♂), with short dense pubescence; eyes moderately small, widely separated (♀), or very large, each about equal in bulk to clypeus, narrowly separated on vertex (♂); maxillary pick with broad apex. Head, body, and legs with short ciliation. Hind tarsus :—ratio of segments 3 : 1 (♂, ♀), basal segment with a row of 22 ctenidiobothria and an additional one beside the most apical. Fore-wings :—*PS* with obtusely angled expanded apex, its vertex lightly rounded; radial fork long, its arms lightly diverging, r_{4+5} as long as, or longer than, fork stalk, rf perpend passing well behind base of m_3; *r–m* junction in a long confluence; *AP* moderately elevated, sub-triangular with rounded vertex; margin, *PS*, and veins (except analis) with strong but fine ciliation. Hind-wings :—r_{2+3} leaving r_{4+5} at an angle of about 60°; *r–m* junction in a long confluence; veins bare, margin ciliated. Fore-wing, 2·7 mm (♂, ♀).

Kenya Colony, Karara, January 1926, 1 ♂, 1 ♀ (*T. W. Kirkpatrick*).

7. **Caecilius gilvus,** sp. n.

Colour. Generally dingy yellow, in life probably pale yellow or orange; eyes black, basally ringed yellow (probably otherwise in life); ocellar tubercle reddish; wings tinged very pale yellowish, veins yellow.

Morphology. Head with distinct median suture; ocellar tubercle not very large; clypeus large and broad; eyes moderate, widely separated; antennae about as long as wings, moderately strong with short fine ciliation; maxillary pick with broad apex. Ciliation of head and body not very long but rather shaggy. Ratio of hind tarsal segments about 3 : 1. Fore-wing :—*PS* expanded apically, its vertex rounded; radial fork long, the arms lightly diverging, r_{2+3} about three-quarters the length of r_{4+5} and as long as, or rather longer than, fork stalk; rf perpend passing near base of m_3; *r–m* junction in a long confluence; *AP* of moderate size, elevated triangularly with rounded vertex; margin, *PS*, and veins (except analis) with strong but not long ciliation. Hind-wings :—r_{2+3}



FIGS. 1–8.—Wings.

1. *Ypsiloneura kirkpatricki*, gen. et sp. n. 2. *Caecilius pallidus*, sp. n. 3. *C. signatipennis*, Endln. 4. *C. ambiguus*, sp. n. 5. *C. obscurus*, sp. n. 6. *C. lucidus*, sp. n. 7. *C. gilvus*, sp. n. 8. *C. brunneonitens*, sp. n.

All figures of approximately the same magnification. Venational nomenclature, after Enderlein (fig. 2):—*PS*, pterostigma; *S*, stigma-sac; r_1, radius; r_{2+3}, etc., branches of radial sector (radial fork); m_1, etc., branches of media; *cu*, etc., cubitus and branches; *AP*, posterior cellule; *an*, analis; *ax*, axillaris; *n*, nodulus (wing-clasp). Cells are named from the vein forming their upper boundary.

leaving r_{4+5} in an angle of about 50°; *r–m* junction in a long confluence; veins bare, margin ciliated. Fore-wing, 3·1 mm.

Kenya Colony, Karara, January 1926. One example, probably ♀ (*T. W. Kirkpatrick*).

8. **Caecilius brunneonitens,** sp. n.

Colour. Generally glossy, deep, warm brown (darker examples nearly pitchy), abdomen crimson. In paler examples the two basal segments of the antennae and the legs are yellowish-brown. Fore-wings warm brown, darkest apically, with some pale areas, viz. an oval below stigma-sac, a space between *rs* and *m* where those veins approach, and about cu_2, also a narrow bordering to most veins; cubital vein very dark. Hind-wings nearly uniformly brown, in darker examples radius and analis with pale narrow bordering.

Morphology. Head rounded, median suture distinct; ocellar tubercle normal; clypeus moderate but well developed; labrum large; eyes moderate, widely separated; antennae shorter than wings, rather slender, with short pubescence; pick with narrow apex. Abdomen :—gonopophyses of normal Caeciliid form, subgenital plate simple with broad, rounded apex. Hind coxae with stridulatory organ; hind tarsal segments in ratio of 3 : 1, basal segment with 16–18 ctenidiobothria. Fore-wings :—apex reduced; *PS* abruptly deepened apically with rounded vertex; *rs* strongly curved concavely before forking, radial fork strongly diverging, r_{2+3} converging towards *PS*, is a little shorter than r_{4+5} and about half as long as fork stalk; rf perpend falls about midway between the bases of m_2 and m_3; *r–m* junction in a very short confluence or in a point; *AP* very small but higher than wide, with rounded vertex directed forwards; margin, *PS* and veins (except analis) with short but strong ciliation. Hind-wing :—r_{2+3} running steeply to fore margin in an easy, hindwardly concave curve; *r–m* junction in a long confluence; veins bare, margin ciliated. Fore-wing, 2·85 mm.

Kenya Colony, Doonda, November 1925, 1 ♀; Kahuguni, December 1925, 2 ♀♀ (*T. W. Kirkpatrick*).

The form of the wings and the venational arrangement approach those of *Protodypsocus,* Endln., 1903, but in that and other related genera the head is flatter with a lamellate hind margin.

NOTES ON PASSALIDAE (COL.) FROM SUDEST ISLAND

By W. D. Hincks, M.P.S., F.E.S.

In the literature at my disposal I have failed to find any records of Passalidae from Sudest Island, or indeed from any of the islands of the Louisade Archipelago. Some interesting material from several of the Papuan islands is contained in my collection, and from Sudest there is a fine species of *Labienus* which is apparently undescribed. This is characterised in the present note, and added thereto are the records of three described forms now noted from this locality for the first time.

The four species listed belong to four different genera of the subfamily Macrolinae,* which are quite typically Papuan in character.

Gravely's two papers (1914 and 1918) show that the material before the author was less complete with regard to the Papuan forms than in the case of the Indo-Malayan, and in consequence, in *Cetejus* and *Protomocoelus* (*Pelops*), it has been necessary to follow Kuwert's Monograph (1896–8) in order to determine the species.

1. *Mastochilus* (*Cetejus*) *peltostictus* (Kaup).

Kaup, 1868, Coleopt. Hefte, **3**: 5–6 (*Acraius*); 1871, Berl. ent. Z. (Suppl.), **1871**: 54.
Kuwert, 1891, Deuts. Ent. Z., p. 166; 1898, Nov. Zool. Tring, **5**: 330.
Gravely, 1918, Mem. Ind. Mus., **7**: 102., fig. xiii; **6**: 99, pl. 1.

One specimen from Sudest Island (ex Coll. *E. C. Horrell*).

My single example of this species agrees fairly well with Kuwert's description and with that of Kaup. Gravely's short notes are inconclusive, though the specimen runs to *peltostictus* in his table, which, however, includes only three species, whereas fifteen forms have been described in this subgenus. Several of these are no doubt synonyms, but a careful study of extensive material and of the types will be necessary to establish the correct synonymy.

2. **Labienus horrelli,** sp. n.

The first two lamellae of the antennal club are very small, the remaining four are very long and slender. The anterior margin of the labrum is concave, the sides slightly convergent behind and the angles rounded, more so on the right side than on the left, which is a little more prominent. The dentition of the mandibles is of the normal type for the genus. The head is smooth, shining and unpunctured except for a few very indistinct punctures in the concavity between the median tubercle and the supraorbital ridges. The anterior margin of the head is almost straight between the outer tubercles and nearly so on either side of them. Frontal ridges are absent and a feeble, lightly concave ridge joins the very small inner tubercles and curves strongly from the latter to the outer tubercles. The area between the outer tubercles is smooth, polished and unpunctured and is obliquely inclined; the tubercles themselves are rather small and are both furnished at their apex with two small blunt processes; the two outer tubercles are of equal length, though the left is broader than the right. The apex of the median tubercle is not free. The marginal grooves of the thorax are widely separated in front and are impunctate and slightly rugose. The thoracic scars are almost entirely without definite punctures and hairs. The median groove is feeble in front and behind and fails to reach the anterior margin of the thorax. The posterior angles of the thorax are rounded and hairy beneath

* Mr. J. R. Dibb informs me that he has two specimens of a species of Aulacocyclinae, viz. *Aulacocyclus parryi*, Kaup, in his collection from Sudest.

and the anterior angles are rounded right angles. The scutellum is impunctate except at the extreme sides towards the base and may or may not have a median line. The elytral striae are deep, impunctate.

The hind margin and lateral lobes of the mentum bear scattered, rather large hair-bearing punctures; the secondary scars are confluent behind and cut off anteriorly a long and rather narrow median section. The mesothoracic episterna bear scattered large punctures especially in front and to the sides. The shining median plate of the mesosternum is almost impunctate except for a few ill-defined and shallow punctures in the vicinity of the more or less comma-shaped and fairly well-defined scars. The metasternum has the lateral areas and the sides of the central plate rugose and densely hairy; the median plate is shining and impunctate except for a number of very shallow indefinite punctures in the anterior portion. The posterior intermediate areas have large and deep anastomosing punctures. The abdominal sterna are polished and impunctate, the scars being rather stronger and more or less circular on the last segment.

Length, 50 mm. (type); 47 mm. (cotype).

Two specimens from Sudest Island (ex Coll. *E. C. Horrell*) in my collection. Named after Mr. E. C. Horrell of Bradford, through whose generosity and

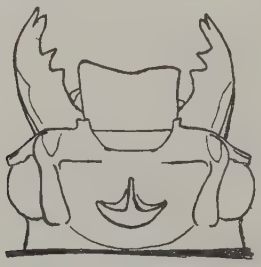


Fig. 1.—*Labienus horrelli*, sp. n., head.

Fig. 2.—*Labienus horrelli*, sp. n., mentum.

kindness I have been able to acquire much valuable material in the Passalidae and in other families.

This species is readily distinguished from any that I can find described by the following combination of characters: The long antennal lamellae, hairless and unpunctured thoracic scars, and the form of the mentum and of the head. In the first two characters mentioned, it is interesting to note that *L. horrelli* combines the differences given by Kuwert as separating *Labienus* and *Vellejus* and confirms the step taken by Gravely (1918, p. 103) in uniting them. The mentum has the secondary scars convergent behind and not widely separated as a whole, a character which would place *L. horrelli* in Gravely's first group (1918, p. 106), and in the table it would run down to *L. impar*, Kuw., a species from which it differs in several respects, including the form of the antennae, which in *L. impar* have six short lamellae.

3. *Protomocoelus gestroi* (Kirsch).

Kirsch, 1879, Ann. Mus. Civ. Genova, **14**: 18.
Kuwert, 1891, Deuts. Ent. Z., **1891**: 167; 1898, Nov. Zool. Tring, **5**: 319 (*Pelops*).

Two specimens from Sudest Island (ex Coll. *E. C. Horrell*).

These agree with the description given by Kuwert after Kirsch's type and with two specimens in my collection from New Guinea (Isola Yule, vi.1875, and Katau, L. M. D'Albertis), one of which was probably determined by

Kuwert. Gravely (1918, p. 107) mentions only one species of *Protomocoelus*, namely *australis*, Boisd. (1835, pp. 246–247), which according to that author is somewhat variable, and this may include the form here named *gestroi*, though the few notes given by Gravely are insufficient to determine this with certainty. It is probable that many of the eleven forms described by older authors are mere variants of one or two species. It may be mentioned that *P. sternbergi*, Zang (Deuts. Ent. Z., **1905 :** 236–238), is certainly a distinct species, of which I have specimens from New Guinea and Little Key.

4. *Gonatas pumilio* (Kaup).

Kaup, 1868, Coleopt. Hefte **3 : 6** (*Aceraius*); 1871, Berl. ent. Z. (Suppl.), **1871 :** 50.
Kuwert, 1891, Deuts. Ent. Z., **1891 :** 169; 1898, Nov. Zool. Tring, **5 :** 313 (*Omegarius*).
Gravely, 1913, Jahrb. Hamburg. wiss. Anst. **30**, Beih. 2 : 112 (*Omegarius*); 1918, Mem. Ind. Mus., **7 :** 108.

Two specimens from Sudest Island (ex Coll. *E. C. Horrell*)

A NEW AFRICAN *PTYCHOPTERA* (DIPT., PTYCHOPTERIDAE)

By F. W. Edwards, M.A., Sc.D., F.E.S.

(*British Museum, Natural History.*)

The genus *Ptychoptera* is represented in Africa by four described species, each known from a single specimen. The discovery of a single specimen of a fifth species is therefore of no little interest.

Ptychoptera hopkinsi, sp. n.

♀. *Head* metallic blue. Antennae black, only the second segment brownish; third as long as fourth and fifth together. Palpi blackish, labella brown. *Thorax* orange, scarcely shining; mesonotum with a pair of rather large but not sharply defined blackish areas behind shoulders; another black area immediately in front of scutellum. *Abdomen* black, somewhat shining, but not metallic; segments 1 and 8–9 and a narrow band in middle of tergite 2 orange. *Legs* with coxae, trochanters and most of femora orange, tips of femora rather broadly black, front tibiae and tarsi black, hind tibiae dark brown, with blackish tip, hind tarsi black, obscurely brownish at base. *Wings* slightly smoky, costal cell yellowish; a conspicuous dark brown seam over cord; fork of R_{4+5} seamed with grey, especially at base. *Rs* shorter than *r–m*; *r* very oblique, appearing as a fork of R_1 equalling tip of latter; fork of R_{4+5} about two-thirds as long as its stem, of *M* less than one-third as long as its stem. Halteres black.

Length of body, 9 mm.; wing, 9 mm.

Uganda : Fort Portal, ix.1931, 1 ♀ (*G. H. E. Hopkins*).

The nearest ally of this species is *P. capensis*, Alex. (Zululand), which has the thorax entirely orange, abdomen largely so, cross-vein *r* vertical, and fork-cells much longer. The other three African species have the thorax metallic blue-black.

NOTES ON THE AQUATIC HETEROPTERA OF THE ETHIOPIAN REGION

By Dr. Tadeusz Jaczewski,

(*Polish Museum of Zoology, Warsaw.*)

Since the publication of the first part of these notes * our knowledge of the aquatic Heteroptera of the Ethiopian Region has been considerably enlarged, mainly owing to the careful investigations of G. E. Hutchinson, who has published several most valuable contributions on the subject during the last few years. There still remains, however, much to be done.

The present paper is based on material that I have received for study on various occasions from the Imperial Institute of Entomology and from the British Museum (Natural History). In this connection I am much indebted to the Director of the Institute and to Mr. W. E. China, of the British Museum.

Mesoveliidae.

Mesovelia vittigera, Horv.

Horváth, 1915, Ann. Mus. Hung., Budapest, **13** : 550–552; Jaczewski, 1926, Ann. Zool. Mus. Pol. Hist. Nat., **5** : 69–70.

The material submitted includes a number of specimens that are beyond doubt conspecific with those from West and North Africa. The species shows a very wide distribution over the African continent, since it comprises examples from Uganda (*G. R. L. Hancock* and *G. H. E. Hopkins*), Northern and Southern Rhodesia, Bechuanaland, Caprivi Strip and the Transvaal (*G. E. Hutchinson*) and Cape Province (*G. E. Pickford* and *G. E. Hutchinson*).

Mesovelia indica, Horv.?

Horváth, 1915, Ann. Mus. Hung., **13** : 553–554.

The correctness of this identification is uncertain, as no male specimens were available for examination. The specimen here in question is brachypterous, smaller than *M. vittigera*, Horv., dark brown above, with pale yellowish middle of venter. In general it fits well Dr. Horváth's description.

Uganda : Kampala, Mungólo, ix.1929, 1 ♀.

Hydrometridae.

Hydrometra albolineolata, Reut.

Reuter, 1882–1883, Öfv. Finska Vet.-Soc. Förh., **25** : 38.

I was able to compare the specimens listed below with a male of Reuter's original series from "Addah, Guinea," † with which they proved to be identical. The original description may be completed with the following details.

Pattern of the hemelytra of the ♂ as shown in fig. 1. Anteocular portion of head a little less than twice as long as the postocular one (49 : 26). Interocular groove scarcely apparent. Clypeus broadly truncate in front and slightly emarginate in the middle, its antero-lateral angles somewhat tuberculiform. Rostrum reaching the basal part of the postocular portion of the head. Relative length of the antennal joints, measured in percentages of the length of the basal joint, as follows :—

1st : 2nd : 3rd : 4th = 100 : 185 : 531 : 346.

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* 1927, *Ann. Mag. Nat. Hist.* (9), **20** : 435–446.

† This specimen was kindly sent me for examination by Dr. G. Horváth, Budapest.

Pronotum slightly longer than half of the length of the head. Distance between the front and the intermediate coxae equals only about $\frac{3}{4}$ of that between the intermediate and the hind ones. Relative length of the various parts of the legs, expressed in percentages of the length of the hind femur, was found to be as follows :—

	Femur.	Tibia.	Tarsus.	(Tarsal joints.)
Front legs	69·8	79·2	14·6	(1·4 + 7·5 + 5·7.)
Int. legs	83·0	89·6	22·6	(1·9 + 14·2 + 6·5.)
Hind legs	100	119·8	24·1	(1·9 + 15·1 + 7·1.)

Front femora reaching with their end in the ♂♂ slightly beyond, in the ♀♀ just to the apex of the head. Hind femora in the ♂♂ projecting slightly beyond the apex of the abdomen, in the ♀♀ reaching the base of the eighth ("genital") segment. Abdomen measuring in length in the ♂♂ a little more than $\frac{3}{4}$, in the ♀♀ a little less than $\frac{1}{2}$ of the total length of the body (with head). All specimens examined were macropterous, their hemelytra reached the base of the seventh abdominal tergite; hind-wings fully developed.

Seventh abdominal sternite of the ♂♂ (fig. 2) with two ventro-lateral spiniform bundles of short thickened hairs near its posterior margin, these appear as small, black spines when feebly magnified. Posterior margin of the seventh tergite fringed with somewhat elongated hairs. Eighth segment with two lateral, rounded tubercles, bearing a brush of thickened hairs. End of the eighth tergite produced into a terminal spine which is about half as long as the tergite itself. Parameres (fig. 3) falciform, armed with several bristles at their concave side.

In the ♀♀ the seventh abdominal tergite is almost glabrous, especially in its basal portion; its posterior angles are armed with two minute black spines, or, perhaps, spiniform bundles of short bristles. The eighth tergite ends with a spiniform terminal process which is slightly curved upwards (fig. 4).

Length, 10–11 mm.

Zanzibar : xii.1924–ii.1925 (*H. J. Snell*), 1 ♂.

Uganda : Kampala, 31.i.1929 (*G. L. R. Hancock*), 1 ♂, 5 ♀♀.

Uganda : Kampala, 8.vi.1927, "on surface of water" (*H. Hargreaves*), 1 ♂, 1 ♀.

Hydrometra ugandae, sp. n.

Closely allied to the preceding species and resembling it in general appearance. Hemelytra of the ♂ brown, only with a longitudinal row of 5 almost circular white spots between the chief veins, closer to the inner one (fig. 5). In the ♀♀ these spots are more elongated but only 3–4 in number. Colour of body resembling *H. albolineolata*, Reut., the white markings being, however, less developed. Antennal tubercles a little more prominent and more acute than in the preceding species. Anteocular portion of head almost twice as long as the postocular one. Distance between the front and the intermediate coxae equal to about $\frac{2}{3}$ of that between the intermediate and the posterior ones. Intermediate coxae inserted therefore distinctly more backwards than in the preceding species. The spiniform bundles of thickened hairs near the posterior margin of the seventh abdominal sternite of the ♂ missing. The lateral tubercles and the terminal spine of the eighth segment more feebly developed. Seventh abdominal tergite of the ♀♀ with a large brush of semi-erect, brown hairs in its basal portion (fig. 6). Posterior angles without spines. Terminal spine of the eighth tergite shorter than in *H. albolineolata*, Reut., and slightly curved downwards.

Length, 10–11 mm.

Uganda : Bugomolo, 24.iv.1927. (*G. L. R. Hancock* and *H. Hargreaves*), 1 ♂, 2 ♀♀.

CORIXIDAE.

Sigara hedenborgi, Lundbl.

Lundblad, 1928, Ent. Tidskr., **48** : 235–237.

S. SUDAN, ix.1917, on S. G. S. Dal (*Capt. Yardley*), 2 ♀♀.

Sigara wahlbergi, Lundbl.

Lundblad, 1928, Ent. Tidskr., **48** : 230–234.

NATAL : Weenen, 2840 ft., i–ii.1924 (*H. P. Thomasset*), 1 ♀.

Micronecta scutellaris (Stål).

Stål, 1858, Öfvers. K. Vet. Akad. Förh., Stockholm, **15** : 319; Hutchinson, 1929, Ann. S. Afr. Mus., **25** : 424–426, pl. xxxiv, fig. 1.

I had first identified this specimen as *M. pharaonum*, Horv.* Owing to the kindness of Dr. G. Horváth I have received for examination a ♂ type-specimen of this last species of which I was allowed also to dissect the genital armature, and I am therefore able to state that it is specifically identical with *M. scutellaris* (Stål). *M. pharaonum*, Horv., 1899. has consequently to be considered as a synonym of *M. scutellaris* (Stål), 1858. I consider it useful to give here figures of the free lobe of the left side of the eighth abdominal tergite (fig. 7) and of the right paramere (fig. 8) of the type specimen of *M. pharaonum*, Horv., for comparison with figures of the corresponding parts of *M. scutellaris* (Stål), which have been published by Hutchinson (*l.c.*).

SUDAN : G. R. F. Medani, 28.i.1923, " in canal " (*H. W. Bedford*), 1 ♀.

Micronecta decipiens, Horv.

Horváth, 1899, Rev. d'Ent., Caen, **18** : 102.

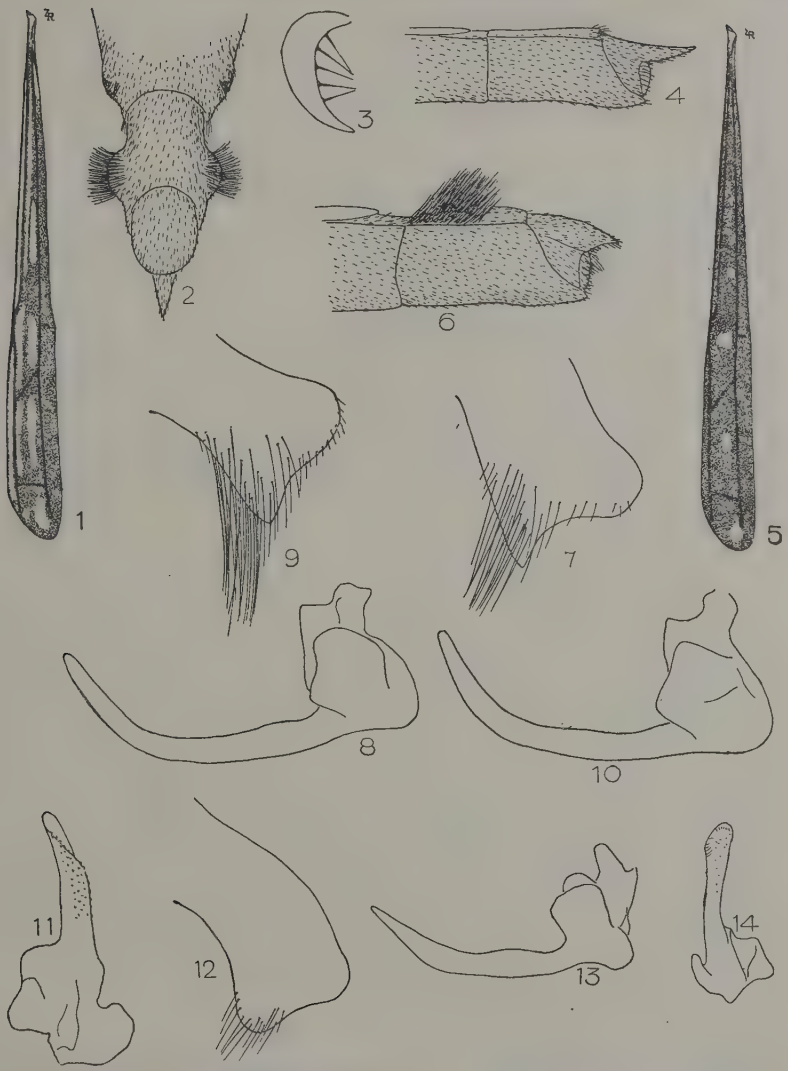
I have had the opportunity of examining a type specimen of *M. decipiens*, Horv., labelled : " Mariout, Égypte, Letourneux, 1881," which has been kindly sent me, for dissection of the male genital armature, by Dr. G. Horváth. To complete the brief original description I am adding here figures of the male parameres as well as of the free lobe of the left side of the eighth abdominal tergite in the same sex (figs. 9–11). As can be seen, *M. decipiens*, Horv., belongs clearly to the " *scutellaris* "-group, and seems to stand close to *M. compar*, Horv. (*vide* Hutchinson).†

Micronecta hutchinsoni, sp. n.

This species stands closest to *M. omeriana*, Hutch.‡ and *M. druryana*, Hutch.,§ particularly to this last which it resembles in general appearance and colour, being, however, comparatively wider in shape.

Pronotal disk, scutellum and hemelytra dark brown, almost blackish, the former smooth and shining, glabrous, with a paler, greyish band along the posterior margin. Hemelytra minutely punctured and very finely pubescent. Scutellar margin of clavus

* Horváth, 1899, *Rev. d'Ent., Caen*, **18** : 102.
† Hutchinson, 1930, *Proc. Zool. Soc. Lond.*, **1930** : 453.
‡ Hutchinson, 1930, *Proc. Zool. Soc. Lond.*, **1930** : 454–455.
§ Hutchinson, 1929, *Ann. S. Afr. Mus.*, **25** : 430–431, pl. xxxiv, fig. 6.



Figs. 1—4, *Hydrometra albolineolata*, Reut.; fig. 1. ♂. Hemelytron, × 7·5; fig. 2. ♂. End of abdomen from beneath, × 52; fig. 3. ♂. Paramere, × 250; fig. 4. ♀. End of abdomen, lateral view, × 33.

Figs. 5—6, *H. ugandae*, sp. n.; fig. 5. ♂. Hemelytron, × 7·5; fig. 6. ♀. End of abdomen, lateral view, × 33.

Figs. 7—8, *Micronecta pharaonum*, Horv. (= *M. scutellaris*, Stål); fig. 7. ♂. Free lobe of eighth abdominal tergite of Horváth's type, × 100; fig. 8. ♂. Right paramere of Horváth's type, × 100.

Figs. 9—11, *M. decipiens*, Horv.; fig. 9. ♂. Free lobe of eighth abdominal tergite, × 100; fig. 10. ♂. Right paramere, × 100; fig. 11. ♂. Left paramere, × 100.

Figs. 12—14, *M. hutchinsoni*, sp. n.; fig. 12. ♂. Free lobe of eighth abdominal tergite, × 100; fig. 13. ♂. Right paramere, × 100; fig. 14. ♂. Left paramere, × 100.

Figs. 1 and 5 are by Mr. Z. Raabe.

widely pale, greyish, this pale space being, however, partly infuscated. Commissurial margin of clavus narrowly pale. Subcostal furrow long, reaching behind the middle of the corium. Right membrane with a slightly sigmoid inner pale line. Left membrane pale. On the corium traces of darker longitudinal stripes. Marginal area mostly pale. Head yellow, often with an infuscated median line on the vertex. Underside and legs greyish-yellow. Head of almost equal width with the pronotal disk, a little more than twice as wide as the synthlipsis. Frontal arch slightly prominent. Pronotal disk twice as long as the head and a little over $2\frac{1}{2}$ times as wide as long. Lateral margins short. Scutellum half as long as the pronotal disk.

Intermediate tarsi about $1\frac{4}{5}$ times as long as the tibiae. Claws $1\frac{1}{3}$ times longer than the tibiae (tibia : tarsus : claws = 15 : 27 : 20). The specimens examined were all macropterous. Strigil as in *M. scutellaris*, (Stål).

Free lobe of the left half of the eighth abdominal tergite of the ♂♂ (fig. 12) with a rounded inner and a similarly rounded, but a little more prominent, outer setigerous angle, showing a concave apical margin between them. In general this lobe shows the type represented with some variations by the species *M. omeriana*, Hutch., *M. druryana*, Hutch., *M. dorothea*, Hutch., and *M. signoreti* (Reut.).

Right paramere (fig. 13) resembling closely that of *M. druryana*, Hutch., but more strongly widened in the terminal portion of the shaft. Left paramere (fig. 14), on the contrary, is reminiscent of *M. omeriana*, Hutch., or *M. dorothea*, Hutch., rather than *M. druryana*, Hutch.

Length, 3–3·5 mm.

East Africa : Lake Victoria Nyanza, Nzoia River, 25.x.1927 (*M. Graham*), 27 specimens.

This species seems to occupy a somewhat intermediate position between *M. omeriana*, Hutch., and *M. druryana*, Hutch., with which two it is probably very closely allied. It differs from both by the shape of the parameres of the ♂♂, as well as by the shape of the free lobe of the eighth abdominal tergite in the same sex, from the former also by the comparatively much longer pronotal disk, and from the latter by the wider shape of the whole body.

I take the liberty of dedicating this species to Mr. G. E. Hutchinson, whose careful investigations have contributed so much to the advancement of our knowledge of the aquatic Heteroptera of the Ethiopian Region.

As to the group of Ethiopian species of *Micronecta* which Hutchinson names the "*gorogaiqua*"-group,* it should be named more correctly the "*signoreti*"-group, as *M. signoreti* (Reut.) is, beyond any doubt, also a member of it.

Micronecta eupompe, Hutch.

Hutchinson, 1930, Proc. Zool. Soc. Lond., **1930** : 455–456.

Uganda : Entebbe, xi.1928, 1 specimen, and 8.i.1929, 2 specimens (*G. L. R. Hancock*).

This species was described originally from Abyssinia, but it seems to be widely distributed over East Africa.

* Hutchinson, 1930, *Proc. Zool. Soc. Lond.*, **1930** : 451.

BEITRAG ZUR KENNTNIS DER LIMACODIDEN (LEP.)

Von Dr. Martin Hering

(*Zoologisches Staatsmuseum, Berlin.*)

(Mit Tafel 2.)

Unter dem mir vom Imperial Institute of Entomology zur Durchsicht zugegangenen Limacodidenmaterial befanden sich einige interessante Stücke und auch einige neue Arten, die nachfolgend beschrieben werden sollen. Dem Direktor des Institutes, Sir Guy Marshall, sei hiermit der herzlichste Dank für die liebenswürdige Ueberlassung zur Bearbeitung ausgesprochen.

1. Niphadolepis schultzei distigma, ssp. nov. (Taf. 2, fig. 6.)

Die Nominat-Unterart, die demnächst in der, "Deuts. ent. Z. Iris" veröffentlicht werden wird, stammt vom Kongo (leg. Dr. Arnold Schultze). Es liegen mir nun zwei Exemplare vor, von der Goldküste und von Sierra Leone, die eine neue Unterart darstellen und nachfolgend beschrieben werden sollen.

Die Vorderflügel sind auf weissem Grunde bräunlich bestäubt, so dass diese Bestäubung vorherrschend ist. Vor der Mitte befindet sich eine weissliche Zickzacklinie, die quer durch den Flügel geht; sie springt besonders auf 1c in einer stärkeren Zacke nach aussen hin vor. Die Querader ist rein weiss; proximal an ihr liegt ein auffallender dunkelbrauner Fleck, aussen an ihr liegt noch ein dunkler weniger deutlicher Strich. Vor der Spitze liegt eine unregelmässige und undeutliche helle, an beiden Seiten dunkler begrenzte Subapikallinie, die bis höchstens zur Flügelmitte am Saum herunterreicht. Am Saum unter der Spitze schliesst sie einen etwa halbkreisförmigen dunkleren Fleck ein. An ihrer Innenseite liegen Spuren einer schwärzlichen Bestäubung, die sich zum Saum fortsetzen und über und unter Ader 3 einen auffälligen schwarzen Fleck einschliessen. Hinterflügel schwarzgrau, am Apex und längs des Innenrandes ockergelblich. Unterseite schwarzgrau, Ränder und Adern ockergelblich. Thorax weisslich, Hinterleib schmutzig ockergelblich behaart. Länge der Vorderflügel 9 mm., Spannweite 17 mm.

Sierra Leone: Njala, 1 ♂, 23.x.1930 (*E. Hargreaves*).

In der Zeichnungsanlage stimmt ganz mit der vorhergehenden überein eine

f. scotina, f. nov. (Taf. 2, fig. 4.)

Hier ist aber die dunkle Bestäubung nicht hellbraun, sondern dunkelgrau, mit eingemischten grünlichen Tönen, besonders im Mittelfeld. Die beiden schwärzlichen Saumflecke sind grösser und zusammenhängender, die Hinterflügel sind einfarbig schwärzlichgrau. Die Unterseite ist ebenfalls schwarzgrau, nur am Apex der Vorderflügel gelblich. Vorderkörper weisslich, grünlich behaart, Abdomen schwarzgrau, basal grünlich. Grösse wie bei der vorigen.

Gold Coast: Ashanti, Insuta, 1 ♂, 9.ix.1928 (*A. W. J. Pomeroy*).

Trotz des verschiedenen Aussehens und der differenten Lokalität gehören beide Formen wohl zu der gleichen Unterart, was erst nach Eingang von mehr Material festzustellen ist. In den Genitalien zeigen sie eine völlige Uebereinstimmung. Die männliche Sexualarmatur der f. *scotina* m. zeigt Taf. 2, fig. 1. Ausser dem Uncus ist ein wohlausgebildeter Saccus vorhanden; die unterscheidenden Merkmale liegen indessen in der Ausbildung der Penisscheide. Die Penisscheide der Nominat-Unterart vom Kongo ist in fig. 2 dargestellt. Der Ventral-Caudal-Rand zeigt dort nur eine geringe Ausbuchtung, während bei der ssp. *distigma* m. wie auch bei ihrer f. *scotina* m. diese Ausbuchtung sehr

tief ist. Nach den Genitalien ist eine Verwechselung der beiden Subspecies also nicht möglich.

Aeusserlich werden beide Formen der Unterart von der Nominatsubspecies, die in fig. 5 dargestellt ist, schwerer zu trennen sein; es scheint aber, dass die Kongo-Form die subapicale dunkle Linie schärfer ausgeprägt hat.

2. *Niphadolepis improba*, Hering, ♀. (Taf. 2, fig. 8.)

Von dieser Art war bisher nur das Männchen bekannt; in der Ausbeute befindet sich auch das in der Zeichnung etwas abweichende Weibchen der Art, das mir ausserdem in einem Exemplar vom Kongo vorgelegen hat, das sich nur durch stärkere dunkle Bestäubung auszeichnete.

Die Vorderflügel sind glänzend weiss, mit schwarzer gezackter Antemedianlinie, die auf Ader 1c in einem stärkeren Zacken wurzelwärts vorspringt. Proximal davon liegt ein nur durch eine schmale weisse Linie begrenztes schwärzliches Querband. Die Postmedianlinie ist ebenfalls stark gezackt, distal von einer schwärzlichen Schattenbinde begleitet. Der Raum um die Querader ist schwarzgrau beschattet, ebenso das Saumfeld, wenigstens teilweise; der Saum selbst ist von Ader 3 bis zum Tornus dick schwärzlich. Hinterflügel weiss, mit sehr grossem diffusen grauen Kreisfleck am Saum, der weit wurzelwärts ausgedehnt ist, aber das Zellende nicht erreicht. Unterseite weiss, der Fleck der Hinterflügel durchscheinend, die Vorderrandshälfte der Vorderflügel grau. Thorax weisslich, Abdomen mit dunkelbraunen Dorsalbüscheln. Vorderflügellänge 11, Spannweite 20 mm.

Uganda: Bwamba, 1 ♀, ix.1929 (*J. Harmsworth*).

3. *Niphadolepis alianta*, Karsch, ♀.

Auch von dieser Art liegt erstmalig das Weibchen vor. Es unterscheidet sich durch bedeutendere Grösse (26 gegen 19 mm.) Die Vorderflügel sind viel leuchtender glänzendbraun, ohne die grauen Töne des Männchens, die Hinterflügel sind goldbraun statt grau. Die Querzeichnungen im Vorderflügel sind nicht so scharf begrenzt wie beim Männchen, namentlich springt in die postmediane Binde die Grundfarbe zackenartig ein. Auch die Unterseite ist rein braun statt braungrau.

Das Männchen wurde mit den Weibchen zusammen erzogen, Art frisst die Blätter von *Coffea*, Kenya: Kiambu, 25.iii.1931 (*R. H. Le Pelley*) Das dazu gehörige Männchen wurde am 24.ix.1929 vom gleichen Sammler erhalten.

4. **Narosa africana,** sp. n. (Taf. 2, fig. 7.)

Wahrscheinlich ist die Gattung *Narosa* von *Niphadolepis* nicht zu trennen. Die nachfolgende Art steht den indischen *Narosa*-Arten so nahe, dass sie in dieser Gattung beschrieben werden soll. Es ist die einzige bisher bekannte afrikanische Art, die eine solche Stellung einnimmt.

Vorderflügel auf weissem Grunde dicht rötlichbraun bestäubt. An der Mitte des Vorderrandes beginnt eine weissliche Querlinie, die sich gabelt und die Form eines umgekehrten Λ einnimmt und den dunkler angedeuteten Fleck am Ende der Zelle umfasst, sich dann weiterhin allmählich verliert. Vor der Spitze beginnt eine weissliche Subapicallinie, die fast rechtwinklig gebrochen ist und etwa zur Mitte des Aussenrandes geht. Zwischen ihr und dem Apex liegt noch eine weitere weissliche undeutliche Linie. Unter dem Apex können drei Punkte schwärzlicher Bestäubung vor dem Saume stehen. Hinterflügel, Unterseite und Körper leuchtend ockergelb, beim Männchen blassgelb. Vorderflügellänge beim ♀ 12, beim ♂ 8 mm., die Spannweite 21 (16) mm.

Kamerun: Johann-Albrechtshöhe, 1 ♀ (type), 1898 (*L. Conradt*

New LIMACODIDAE.

coll. Oberthür, im Staatsmuseum Berlin); Garua, 1 ♂ (type), 18.–24.1909 (*Riggenbach*—Staatsmuseum Berlin).

Gold Coast: Insuta, Ashanti, 1 ♀, 9.ix.28 (*A. W. J. Pomeroy*).

Die Art steht am nächsten der indischen *N. concinna* Swh., bei der aber die weissliche Querlinie von der Vorderrandmitte schräger verläuft und nicht den Zellendfleck einschliesst. Der ganze Saum besitzt bei ihr die dunklen Saumpunkte.

5. **Parasa dentina,** sp. n. (Taf. 2, fig. 3.)

Die neue Art, von der nur ein Weibchen vorliegt, steht am nächsten *P. ananii,* Karsch bezw. ihrer Form *infuscata,* Wichgr? Sie stimmt namentlich mit der letzteren in den dunklen Hinterflügeln überein, die bei ersterer bleichgelb sind. Vorderflügel mit breitem grünem Mittelfeld, Wurzel-und Saumfeld hell chokoladenbraun. Das dunkle Wurzelfeld ist gewinkelt-gradlinig begrenzt und springt nach aussen in einem Zahn auf dem Zellhinterrand vor. Die innere Begrenzung des Saumfeldes verläuft unter dem Vorderrand zuerst nach innen konkav, es springt dann wurzelwärts auf Ader 4 in einem stärkeren, auf 2 und 3 je in einem unmerklich kleinen Zahn vor und geht zum Schluss konkav zum Innenrand. Die Adern und die innere Begrenzung des Saumfeldes sind auffallend verdunkelt. Hinterflügel chokoladenbraun, an Wurzel und Aussenrand etwas gelblich getönt. Unterseite braun, am Saum und Innenrand der Flügel ockergelblich getönt. Körper unten dunkelbraun, Thorax und Kopf oben grün, Hinterleib bräunlich, ockergelb getönt. Vorderflügellänge 13, Spannweite 28 mm.

Nigeria: Ibadan, 1 ♀, 14.vii.29 (*F. D. Golding*).

Es ist sehr unwahrscheinlich, dass es sich bei dieser Art um das noch unbekannte Weibchen von *P. ananii,* Krsch., handelt. Trotz der ähnlichen Zeichnung besitzen die beiden verglichenen Formen schmälere und am Apex weniger gerundete Vorderflügel. In der Form der letzteren steht die Art näher *P. prussi,* Krsch., und *P. catori,* B.–B., die aber anders gestaltetes Wurzelfeld besitzen.

6. *Limacosilla pirifera,* Hering, ♀.

Von dieser auffallenden Art liegt mir nun zum ersten Male auch das Weibchen vor. Es ist im allgemeinen dem Männchen ähnlich, ist jedoch grösser, die Vorderflügel sind mehr gerundet, weniger zugespitzt, blasser und weniger kontrastreich gefärbt. Namentlich die Apicalhälfte des Vorderflügels zeigt nur wenig Verdunkelung nach der helleren Schrägstrieme, die den birnförmigen dunklen Innenrandsfleck vorderrandwärts begrenze. Mit einer Serie von 5 Männchen liegen mir die beiden Weibchen vor von Sumatra: Naga Hoeta Est., P. Siantar (*R. I. Nel*). Während die Männchen vom 23.x.stammen, tragen die Weibchen das Datum des 19. und 29.xii.1930.

Erklärung der Tafel 2.

Fig. 1. **Niphadolepis schultzei distigma,** Her., f. **scotina,** Her. Sexualarmatur des ♂ in Ventralansicht (Goldküste).
2. **Niphadolepis schultzei schultzei,** Her. Penis-Scheide des ♂. (Kongo.)
3. **Parasa dentina,** Her., ♀. (Type, Nigeria.)
4. **Niphadolepis schultzei distigma,** Her., f. **scotina,** Her., ♂. (Type, Goldküste.)
5. **N. schultzei schultzei,** Her., ♂. (Type, Kongo.)
6. **N. schultzei distigma,** Her., ♂. (Type, Sierra Leone.)
7. **Narosa africana,** Her., ♀. (Paratype, Goldküste.)
8. **Niphadolepis improba,** Her., ♀. (Bwamba.)

Die Sexualarmaturen sind c. 30 ×, die Falter c. 2 × vergrössert.

DREI NEUE THRIPIDEN

Von Dr. H. Priesner

(*Cairo.*)

Material des Hamburger Museums enthielt folgende neue Arten, die ich durch die Güte des Herrn Dr. E. Titschack zur Untersuchung zugesandt erhielt. Eine der Arten ist Vertreter einer neuen Gattung.

1. **Hercothrips trilineatus,** sp. n.

♀: *Kopf* und *Prothorax* gelb, mit drei breiten, gemeinsamen, dunklen Längslinien, 1 in der Mitte, beginnend etwa in der Höhe der Augenmitte, zwei an den Seiten, die am Prothorax breit, an den Wangen schmal sind. Thorax und Abdomen dunkel rötlichbraun, die Endsegmente etwas lichter; Vorderbeine hellgelb, kaum, oder undeutlich schattiert, Mittel-beine mit dunklen Schenkeln und hellgelben Tibien und Tarsen, die Tibien haben einen breiten, braunen Ring hinter der Basis. Hintertibien dunkel, an der Basis mit sehr schmalem gelbem Ring (die Spitzen der Hintertibien dürften wieder schmal gelb sein, ich vermag dies aber nicht zu entscheiden, da sie auf der Unterseite des Abdomens eingeschlagen liegen). Borsten am Körper licht. Fühlerglied 1 wie der Kopf gefärbt, kaum etwas getrübt, Glied 2 etwa von der Färbung des Kopf-Mittelstreifs, 3 rein hellgelb, 4 hellgelb mit stark getrübter Keule, 5 am Endrand, aber etwas schwächer getrübt als 4, 6 bis 8 *dunkel*braun. Die Flügel sind *stark*, fast gleichmässig braun getrübt, die vorderen vor der Adergabel mit fleckenartiger Aufhellung, die aber nicht hyalin ist, ebenso an der äussersten Basis des Vorderrandes etwas hell, Hinterflügel etwas heller grau, mit schwarzbrauner Längsader und fast hyalinem, ovalem Fleckchen, knapp vor dem Beginn der Längsader. *Kopf* 120 (von den Augen an dorsal 113)μ lang, an den Augen 176 μ breit, diese grob facettiert, 62–64 μ lang, kaum oder nicht behaart, vorn etwas vorstehend, da die Fühlergruben tief sind. Interantennalfortsatz etwa 34 μ breit, vor fast gerade abgestutzt. Scheitel oben genetzt, gebogene Interocellarborsten an den Seiten des Frontocellus; etwas kürzere Postocellarborsten, zur Postokularreihe gehörig, 28 μ lang, etwas hinter dem Niveau des Augenhinterrandes, zwischen diesem und den hinteren Ocellen gelegen. Kopf an den Wangen etwas schmäler als an den Augen, 173 μ breit. Scheitel mit einer nicht sehr markierten Trennungslinie zwischen Vorder-und Hinterfeld, das hinter den Postocellarborsten liegt und gegen den Kopfhinterrand, wenigstens seitlich, ausserhalb der braunen Mittellängslinie, aus etwas in die Quere gedehnten Netzmaschen besteht. Fühlergliederlängen(-breiten): 20 (25), 42? (31), 70 (19), 52–53 (20), 45 (20), 39 (17), 15 (8), 36 (6) μ. Das 1. Glied klein, an den Seiten etwas gerundet, das 2. mit deutlichen Netzriefen, die am 3. und 4. Gliede undeutlich sind, das 3. mit der für Heliothripinen charakteristischen Ringverdickung, distal vom Stielchen, am Ende geschnürt, auch das 4. deutlich vasenförmig, aber viel kürzer als das 3., das 5. nicht vasenartig, aber im letzten Drittel zum Ende verengt, das 6. am Ende schräg abgestutzt; Sinneskegel am 3. und 4. Glied gabelig, aber nur mässig lang. Mundkegel normal, ohne Besonderheit. Pronotum nur etwa 113 μ lang, 220 μ breit, an den Seiten gerade, aber an den Ecken gerundet, die Vorderecken kaum merklich fast etwas lamellenartig abgeflacht, Pronotumfläche mit unscharfer Netzung. Vorderbeine wie die übrigen einfach, mit netziger Struktur. Mesothorax breiter als lang, 310 μ breit. Borsten auf den Flügeln sehr kräftig und dunkel, nur nahe der Basis, im Anfangsteile der Hauptader und auf der Schuppe licht und schwach. Costa mit 4 schwachen lichten und 19–20 (diese gegen die Flügel-Spitze dünner) dunklen, Hauptader mit 4 lichten, basalen, hinter dem hellen Feld aber mit 13 dunklen, starken Borsten; Nebenader mit 11 dunklen, starken Borsten, Schuppe mit 4 schwachen, dem Vorderrande genäherten, gelblichen Dorsalborsten. Der Vorder-und Hinterrand der Flügel befranst, die Adern sehr stark, der Beginn der Nebenader sehr dick. Abdomen bei dem geschrumpften Stück kurz oval, stark zugespitzt; das 9.

Segment oben hinter der Basis mit lateraler Kammplatte, seine Endrandborsten B. 2 etwa 85, B. 3. 70 μ lang, gelb. Borsten am 10.Segment schwächer, 70 und 56 μ lang. Das 10.Segment *ganz* gespalten.—Körperlänge (geschrumpft): 1·12 mm.

Patria: Ich sah nur 1 Exemplar, das von *J. Vosseler*, 13.5.1907, in Ost-Afrika: Amani, von Bermudagras geketschert wurde. (Type im Museum Hamburg.)

Die Art ist mit *H. brunneipennis*, Bagn. (Ceylon), zu vergleichen, mit dem sie in der Flügelfärbung übereinstimmt; diese eben genannte Art ist aber wohl schlanker gebaut, hat überdies gleichlanges 3 und 4. Fühlerglied, schlanke Flügelborsten, nur 4 + 2 Borsten der Hauptader und 6 Borsten der Nebenader, ferner die viel längeren Sinneskegel an den Fühlern und andere Färbung der Fühler.

2. **Kakothrips firmoides**, sp. n.

♀: Schwarzbraun, ebenso die Beine mit Ausnahme der Vordertibien, die lichter sind, etwa bräunlichgraugelb mit dunkleren Rändern: Vordertarsen graugelb, Mittel-und Hintertarsen dunkel gelbgrau. Fühler braunschwarz, nur das 3.Glied gelbgrau, am Stiel gelblich, wie die Endhälfte des 2.Gliedes gelblich. Borsten am Körper dunkel, am Ende licht, der Raum zwischen der Schuppe und dem Beginne der Nebenader ist licht, doch bleibt der Vorderrand des Flügels dunkel. *Kopf* etwa 95, samt Interantennalfortsatz 104 μ lang, an den wenig vorragenden, etwas abgeflachten Augen 120, hinten etwa 130 μ breit. Interantennalfortsatz vor kaum ausgeschnitten, Augen wenig deutlich behaart, Wangen fast gerade oder etwas nach hinten erweitert; 1 Querwelle am Hinterkopf stärker als die übrigen Runzeln. Vorderer Ocellus kleiner als die beiden seitlichen, welche vor dem Hinterrande der Netzaugen liegen; 1 Paar winziger Anteocellarborsten vor dem Frontocellus, ein weiteres Paar an den Innenrändern der Netzaugen, etwas hinter dem Niveau des Frontocellus; Interocellarborsten gut entwickelt, *zwischen den hinteren Ocellen gelegen. Postokularborsten lang.* Mundkegel ziemlich lang und spitzig, den Hinterrand des Prosternums erreichend (Maxillarpalpen im Präparat nicht sichtbar). Fühler 240–260 μ lang, ähnlich wie bei *Taeniothrips firmus* gebildet. Gliederlängen(-breiten); 20 (B. 28, Sp. 22), 36 (24), 42–43 (20), 42 (21), 35–36 (20), 45 (20), 8 (7·5), 13 (6) μ. Das 1.Glied zum Ende deutlich verengt, das 3. mit ringartiger Stielverdickung, und wie das 4. mit gabeligem Sinneskegel, das 5.Glied wie das 4. und 6. fast gestielt, gegen das Ende vom letzten Drittel an stark verengt. Stylus nur mässig lang. Prothorax 120 μ lang, 165 μ breit; Vordereckenborsten lang, etwa 56 μ, länger als die inneren Vorderrandborsten, die aber ebenfalls gut entwickelt sind, Hintereckenborsten 56–59 μ, die inneren 65 μ, Hinterrand innerhalb der Eckenborsten mit drei Paar kurzen Börstchen. Vorderbeine kräftig, Vordertibien einfach, *Vordertarsen am Ende mit klauenförmigem Zahn.* Mesothoraxbreite 225–242 μ, Flügellänge 0·76 mm. Adern deutlich, Costa mit 17–18, wenig dicht stehenden, Hauptader mit 15, ebenso gestellten, Nebenader mit 9–11 Borsten. Am 8.Segment vermag ich keinen deutlichen Kamm zu erkennen. B. 2, 3 am 9. Segment fast 100 μ, Borsten am 10. Segment 93 und 87 μ lang. 10.Segment fast bis zur Basis gespalten. Hintertibien in der Hinterhälfte des Innenrandes mit einer Reihe kräftiger, kurzer Börstchen. —Körperlänge (kontrahiert): 1–1·12 mm.

Patria: Spanien: Pyrenäen, Alp Urtg b. Puigcerda, 28.5.1930, aus Blüten von Stachelginster (*F. Diehl*). (Type im Museum Hamburg.)

Larven, die vermutlich hierher gehören, was aber durchaus nicht sicher ist, wurden an derselben Lokalität gefangen und fanden sich im selben Blütenmaterial. Diese sind denen von *Taeniothrips firmus* äusserst ähnlich.

Hellgelb, mit orange Pigmentierung, zuweilen tritt ein orangegelber Mittelstreif deutlicher hervor. *Graue Flecke am Kopf und Thorax fehlen*, dunkelbraun getrübt sind aber die beiden letzten Drittel des 10.Segmentes, das hinter den Borsten, in der Mitte noch

etwas gerundet vorgezogen ist. Kopf und Fühler schlank, ersterer etwa 90 μ lang, an den Augen 78 μ breit. Kopfborsten spitzig, ein Vorderaugenbörstchen etwa 15 μ lang, oben am Kopf stehen weitere drei Paar Borsten, von denen eines am Innenrande der Augen gelegen ist, alle mässig lang. Fühler 173 μ lang. Gliederlängen(-breiten): 14–15 (25), 28 (21), 42–43 (22), 50 (19), 10 (11), 22 (6) μ. Hintereckenborste am Prothorax 36–39 μ lang, spitzig. Mesothorax und Abdomen gehöckert, die Höckerchen am Abdomen *grob*, flach, ohne Microsetulae. B. 2 am 9.Segment 45–48 μ lang, B. 3 kürzer, gerade nach hinten, unten gerichtet, 30 μ. Borsten am 10.Segment 45–48 μ lang. 9.Tergit am Hinterrande mit einer Querreihe von feinen, wenig dicht stehenden Zähnchen, das 8. Sternit mit einer Hinterrandreihe von *grossen, aber ungleichlangen Zähnen:* je 4–5 kleinere an beiden Seiten und 3 grosse, innere, von denen der unpaare mittlere eine Länge von 28–31 μ bei einer Grundbreite von 18–20 μ hat. Auch die Reihe rudimentärer Zähnchen wie bei *Taen. firmus*, Uz.—Körperlänge: 1·07–1·14 mm.

Durch die 8-gliedrigen Fühler, den Besitz einer langen Borste an den Vorderecken des Prothorax, die länger ist als die innere Borste des Vorderrandes, das Zähnchen an den Vordertarsen und die Stellung der Interocellarborsten wird diese Art, obwohl das ♂ noch nicht bekannt ist, in die Gattung *Kakothrips*, Will., verwiesen, von der bisher nur 1 Art, *K. robustus*, Uz., bekannt war.

Die Kopf-und Fühlerform, Körpergrösse, besonders aber die vermutlich hierher gehörigen Larven lassen mit aller Deutlichkeit erkennen, dass die Art äusserst nahe verwandt ist mit *Taeniothrips firmus*, Uz., von der wir ja wissen, dass sie auch zu *Odontothrips* Beziehungen hat. Es scheint also, dass, wenn die oben beschriebene Larve wirklich hierher gehört, *Kakothrips* sowohl mit *Taeniothrips*, als auch mit *Odontothrips* durch die Entdeckung dieser neuen Art äusserst nahe verbunden sind.

Von *Kakothrips robustus*, Uz., ist die neue Art sehr leicht durch die viel geringere Grösse und die kurzen Fühler zu unterscheiden und ist von ihr mindestens subgenerisch verschieden; habituell ist sie *Taeniothrips firmus*, auch im Imago-Zustande weitaus ähnlicher.

3. **Dichromothrips**, gen. n.

Kopf gestreckt, samt Interantennalfortsatz so lang wie breit, nach vorn etwas, aber wenig vorgezogen, Augen etwas vortretend, Kopf hinter ihnen leicht geschnürt, Wangen parallel. Fühler sehr schlank, 8-gliedrig, die mittleren Glieder vasenförmig, das 5. gegen das Ende nicht verengt, Stylus schlank, 2-gliedrig, sein 1. Glied länger als breit. Sinneskegel gabelig. Mundkegel normal, Maxillarpalpen schlank, 3-gliedrig. Prothorax ohne längere Vordereckenborsten, mit 1 Paar *langen*, inneren Hintereckenborsten, während die äusseren Hintereckenborsten zu sehr kleinen gekrümmten Börstchen verkümmert sind. Flügel an der Basis breit, vom zweiten Drittel ab schmäler, mit 2 Längsadern und gut entwickelten Aderborsten. Abdomen normal, Beine einfach, Abdomenende mit langen dunklen Borsten, 10.Segment oben *nicht* gespalten. ♂ *ohne* Dornen auf den Tergiten, aber mit sehr kräftigen Borsten am Abdomenende und *je zwei Drüsenfeldern* auf den Sterniten 3–7. Körper auffallend zweifarbig, überdies mit rotem Innenpigment.

Typus generis: *Dichromothrips orchidis*, sp. n.

Dichromothrips gehört, wohl in die Nähe von *Chaetanaphothrips*, von welcher Gattung (!) sie sich durch den robusteren Körperbau, die längeren Borsten am Prothorax, den langen Kopf und Prothorax, die breiten Flügel mit den kräftigen Aderborsten und wahrscheinlich auch durch die männlichen Sexualcharaktere unterscheidet. Von *Taeniothrips* ist die Gattung durch den Besitz von nur 1 Paar langen Borsten am Prothorax, von *Oxythrips* durch die dünnen, langen Fühler und die auffallende Färbung, von *Scirtothrips* durch den robusteren Körperbau und die viel kräftigeren Borsten generisch verschieden.

Dichromothrips orchidis, sp. n.

♀: Braunschwarz, mit rotem Pigment im Kopf, Thorax und etwas im Abdomen, hellgelb sind: Das 3.—6. Abdominalsegment, das 3. am Vorderrande etwas gebräunt, Schenkel wie der Körper gefärbt, alle Tibien und Tarsen rein zitronengelb, nur die Tarsenstabplatte schwärzlich. An den Fühlern das 1. und 2.Glied wie der Kopf, das 3.—5. hell zitronengelb, das 4. hinter der Mitte undeutlich ringartig getrübt, das 5. am äussersten Ende schwach getrübt, das 6.–8. graubraun, das 7. und 8. etwas lichter als das 6., dieses am Grunde etwas aufgehellt. Borsten am Körper dunkel. Flügel gebändert; Grundfarbe hyalin, stark getrübt sind etwas mehr als das 2.Viertel der Vorderflügel, und deren Spitze (etwa 1/7–1/6 der Länge), die Schuppe, mit Ausnahme der hyalinen Spitze, und die äusserste Basis des Flügelvorderrandes; an den Hinterflügeln sind die Querbinde und die Spitzentrübung viel weniger deutlich. Die Costalborsten sind sehr kräftig und besonders an den Querbinden sehr dunkel. *Kopf* vom Augenvorderrand zum Hinterrand, in der Mittellinie gemessen, 138, samt Interantennalfortsatz, der vorn eingeschnitten ist, 165 μ lang, an den Augen 163 μ breit. Augen gewölbt, mit groben Facetten, behaart, seitlich 78, dorsal 86 μ lang. Kopf hinter den Augen etwas geschnürt, Wangen parallel, etwas gekerbt, da der Scheitel deutlich querwellig ist; Hinterrandleiste des Scheitels dick, schwarz. Längere Postokularborsten fehlen; direkt vor dem vorderen Ocellus, der vom Vorderrande des Kopfes sehr weit abgerückt ist, keine Anteocellarborsten. 1 Paar solcher findet sich nur seitlich, nahe dem Innenrande der Netzaugen, nur wenig vor dem Niveau des Frontocellus; Interocellarborsten in normaler Lage, lang, dunkel. Mundkegel kurz, Maxillarpalpen lang, schlank, dreigliedrig. Fühler etwa 400 μ lang, sehr schlank, das 3. und 4.Glied halsartig ausgezogen, mit langen, gabeligen Sinneskegeln, 5.Glied schlank, vor dem Ende nicht oder kaum verengt, breit an das 6. anschliessend, das eine breite Basis besitzt, das 7.Glied viel länger als breit, das 8. nur etwas länger als das 7. Fühlergliederlängen(-breiten): 25 (B. 36, Sp. 31), 42 (28), 95 (24), 90 (23), 53–55 (17), 64–67 (17), 14 (7), 17 (5) μ. Prothorax 168 μ lang, 208 μ breit, seitlich stark gerundet, an den Vorderecken ohne, an den Hinterecken mit 1 langen (etwa 73 μ), dunklen Borste, ausserhalb derselben mit 1 sehr kurzen, verkümmerten Borste, innerhalb der Hinterecken zwei Paar kleine Börstchen sichtbar. Vorderbeine kräftig, einfach. Mesothorax etwa 295 μ breit. Flügellänge 0·9 mm. Costa mit 27–28, Hauptader mit 4–6 basalen, Borsten, auf diese folgt in kurzem Abstand 1 Borste, am Ende des Flügels stehen zwei; man kann also von 1 + 2 Distalborsten sprechen; Nebenader mit 13–16 Borsten. Abdomen normal, 8. Tergit mit aus *dicht stehenden*, langen dunklen Härchen bestehendem, vollständigen Kamm, Borsten am 9.Segment sehr lang, B. 3 fast 183 μ, kräftig, dunkel; Borsten 2 am 10.Segment 168 μ. Das 10.Segment nicht gespalten. —Körperlänge (gedehnt): 1·69 mm.

♂: In der Färbung mit dem Weibchen übereinstimmend, das 4.Fühlerglied kann bisweilen ganz hellgelb sein, wie das 3., das 6. ist an der Basis nicht getrübt. Costa mit 25, Hauptader mit 3 + 5 basalen und 1 + 2 distalen Borsten, Nebenader mit 13 Borsten. 8. Tergit mit vollständigem Kamm aus dunklen Härchen. 9. *Tergit oben tief bogig ausgeschnitten, an den Seiten mit auf Höckern sitzenden, sehr langen und dicken* (6 μ) *Borsten*, von denen 1 längere 125, 1 kürzere 65 μ misst. 10. Segment mit etwas dunkleren, längeren Borsten, B. 2 (lateral) etwa 140 μ lang. Auch das 8. Segment bereits mit 1 Paar kurzen, dornartigen Lateralborsten. Die Drüsenfelder am 3.–7.Sternit sind *kreisförmig und paarig*, d.h. zwei auf 1 Segment nebeneinander; jedes der Felder ist 22–27 μ lang, 32–34 μ breit; sehr deutlich sichtbar sind sie auf Segment 7, weil dieses bereits dunkel ist. Die Drüsenfelder sind punktiert. Masze: Kopflänge 120 μ, samt IAF. 142 μ, Kopfbreite an den Augen 147 μ. Fühlerlänge 363–380 μ. Fühlergliederlängen(-breiten): 25–28 (34), 36 (27), 78 (17), 76(18), 52 (16), 59 (15), 13 (7), 15–17 (4) μ. Prothorax 130 μ lang, 182 μ breit. Mesothorax 242 μ breit.—Körperlänge: 1·14–1·26 mm.

Patria: India: Birma, aus Gewächshaus, mit Orchideen (*Dendrobium thyrsiflorum*) eingeschleppt. (Typen in der Sammlung des Museums Hamburg.)

NOTES ON EXOTIC DIPTERA (1)

By John R. Malloch.

Family Rhagionidae.

Genus *Atherix*, Meigen.

This genus in the strict sense occurs in Europe, Asia, and North America, but a number of species placed therein from the Orient and southward throughout the Malayan region cannot, in my opinion, correctly be retained in it.

In defining the genus, the general method has been to adopt the following characters: Medium-sized flies with spotted or banded abdomen and banded wings; first two segments of the antennae subequal, subglobose, the third somewhat kidney-shaped, with a subdorsal arista; eyes of males contiguous, those of the females separated; tibial spurs 0 : 2 : 2; anal cell closed somewhat before the border of the wing. This is an exact copy of the definition in Leonard's *North American Rhagionidae*, published in 1930.

Taken broadly the characters listed suffice to distinguish the genus, but there are some other unmentioned characters which it appears pertinent to introduce in order to establish more definitely the status of the genus as more distinct from *Rhagio*, F., and its nearest allies than these latter are from each other.

A careful examination of any Rhagionid discloses the presence of a small protuberance on the anterior surface of the thorax directly mesad of each lower extremity of the propleura, which are usually more or less hidden when the head is in the natural position. These processes or protuberances are sometimes almost acute at their apices and at other times merely rounded, but in all cases they are quite well developed. In *Rhagio* and its nearest relatives these protuberances are haired, sometimes very densely so, while in *Atherix* they are bare. The postnotum in *Rhagio* and allied genera is evenly convex and gradually sloped away from the base of the underside of the scutellum while in *Atherix* there is a distinct convexity, or almost what might be considered as a postscutellum. This latter character is met with in *Symphoromyia*, Frauenfeld, in a less developed state, and in *Glutops*, Burgess, of the subfamily Arthroceratinae in a more developed state than in *Atherix*.

The simple third antennal segment with its dorsal arista and the short basal segment serve as good distinguishing characters apart from the two listed above. It may be mentioned also that the radial vein, or stem vein, of the wing is haired on its upper surface to, or almost to, its base, while in other genera except *Dialysis*, Walker, there are no hairs basad of the level of the humeral cross-vein or from but a short distance basad of that point.

Taking these characters as criteria for the distinction of *Atherix* from its allies we find that certain Oriental species placed in the genus fall within its scope, but their habitus is quite different from that of typical species of the genus as they are much more slender and much less sombre coloured, and the bases of veins R_{4+5} and Cu_1 lack the setulae on upper surface. Osten Sacken in describing one of these forms, *limbata*, O. S., in 1882, stated that Walker had labelled his type specimen with the generic name *Suragina*, Walker, and that he was not prepared to either retain or reject the genus although he pointed out that it was most closely allied to *Atherix*. Recent workers have disregarded Walker's genus, and several species have been described as belonging to *Atherix* that ought really to be removed to the next genus.

Genus *Suragina*, Walker.

1860, J. Proc. Linn. Soc., **4**: 110.

It is not my intention to deal *in extenso* with the species of this genus, but merely to point out some characters that I believe might be considered as a basis for its acceptance as distinct from *Atherix*.

As already mentioned, the species are all very much more slender than typical species of *Atherix*, and are more brightly coloured, but in addition to these features there are, at least in the three species before me, structural characters which justify me in my proposal that the genus *Suragina* be accepted as distinct from *Atherix*.

In *Atherix variegata* and *ibis* there is a small knob-like process on the anterior inner surface of each hind coxa near middle similar to that in the genus *Xylomyia*, Rond. In most of the genera related to *Rhagio* there is merely a convexity present. In *Suragina* this process is as well developed as in *Atherix*, and in addition there is a very noticeable slender process at the extreme apex of the coxa on its ventral surface that is lacking in *Atherix*. The females of *Suragina* before me have the frons very much narrower than in typical *Atherix*, being about five or six times as long from vertex to anterior margin as wide at middle, while in *Atherix* it is less than three times as wide, and in the former it is much less noticeably haired. A rather striking character lies in the greater distance of the posterior ocelli from the vertex in *Suragina* than in *Atherix*, the former having the distance greater than the length of the ocellar triangle, while in *Atherix* it is less than that length. The postnotum is more prominently rounded in *Suragina* than in *Atherix* and there is a more pronounced central excavation and lateral tumid area on each side of it in the first abdominal tergite in the former than in the latter.

I believe all the species included by Brunetti from India in the genus *Atherix* belong here, but cannot give a definite opinion without access to the types; also I consider *Atherix furcata*, de Meijere, and *A. lucens*, de Meijere, to be members of the genus.

Suragina nigripes, sp. n.

♂. Very similar to *cincta*, Brunetti, to which it will run in the key to species given by that author,* but readily distinguished from it by the entirely black legs. Entire insect black, distinctly shining, the thorax with whitish dust, least evident on mesonotum, and the abdomen with large triangles of white dust on the posterior lateral angles of the tergites of basal half, the extent of the triangles much reduced on apical half. Wings with a quite conspicuous fuscous cloud over the stigma which extends over disc of the wing to slightly beyond middle at base of discal cell, narrowing posteriorly, and an apical paler brownish cloud which is narrowly separated from the stigmal one by a hyaline streak that widens out to cover the entire discal cell. Hind metatarsus not thickened; fourth posterior cell widely open in margin of wing; hypopygial forceps conical. Fore tarsal claws very short; hind coxae with the apical process short but distinct.

Length, 11 mm.

Type, Philippine Islands, Mt. Moises, Isabele, Luzon, April 1927 (*R. C. McGregor*). U.S. Nat. Mus.

Suragina fascipennis (Bezzi).

A pair of this species in the U.S. Nat. Mus. and one in my collection from the Philippines.

* 1909, *Rec. Ind. Mus.*, **2**: 418.

Suragina limbata (Osten Sacken).

One female of this species in the U.S. Nat. Mus. agrees *in toto* with the original description. It is from Surigao, Mindanao, P.I. (*C. F. Baker*).

Suragina brunettii, nom. nov.

This name is proposed for the species described as *Atherix limbata* by Brunetti.* It differs from *limbata* in having the dark annulus on the hind femur at middle instead of close to apex, the femora yellow with the tips narrowly black, the mid pair having a very small black streak on the underside near the base, remainder of legs black, but the middle tibiae dark brownish-yellow. In *limbata* the fore and mid femora and the mid tibiae are testaceous yellow, with the apices of femora slightly browned above. The halteres and scutellum in *limbata* are entirely yellow, and there is no oblique hyaline fascia extending partly across the wing from costa beyond the stigma as is figured by Brunetti, the wings being almost uniformly but slightly brownish on the portion beyond the base of the discal cell.

Mexican Species.

There are three species recorded from Mexico as belonging to *Atherix* and as all three are now before me I present below some data upon them. All agree in the characters of the hind coxa with *Suragina* as accepted above, having the apical process well developed, but the frons in the females is only about three times as long as its width at centre, and the ocelli are nearer to the vertex while the surface is but sparsely haired, thus somewhat intermediate between typical *Atherix* and *Suragina*. The species are all slender and all differ from both the other genera in having the sternopleura bare. It might be possible to accept this segregate as at least a subgenus of *Suragina*, but I leave the determination of that matter to some future worker who may have sufficient material for a thorough revision of the family. As there is no published complete key to the species in question I present one below as an aid to their identification.

Key to the Species.

1. Legs entirely black; frons fuscous, brownish dusted, only the lateral margins with noticeably greyish dust; abdomen black, apices of tergites densely whitish grey dusted; apical fuscous band on wing distinctly darker on the veins than between them . . . . . *latipennis*, Bellardi.
— At least the femora largely yellowish; frons distinctly whitish or yellowish dusted on at least the lateral and anterior margins . . . . . 2.
2. Abdomen black, the apices of tergites densely whitish grey dusted; fore coxae fuscous and white dusted, fore tibiae and tarsi and bases of hind tibiae dark brown or fuscous; preapical dark fascia on wing extending beyond the apex of stigma and no isolated dark mark on costa between it and the apical fascia . . . . . *longipes*, Bellardi.
— Abdomen testaceous yellow, with black triangle on each tergite of basal half which becomes a black basal band on the tergites of apical half, and the apices densely white dusted; fore coxae, fore and hind tibiae, and bases of fore tarsi yellow; preapical fascia on wing not extending entirely to apex of stigma, and a small dark spot on costa between stigma and inner margin of the apical dark fascia . . . . . *concinna*, Williston.

It may be pertinent to note that all three species in this group have in the female, the only sex known to me, a very deep longitudinal furrow or canal in centre of the frons, which furrow is not present in *Atherix*, and very slightly indicated in the species of *Suragina* known to me.

* 1909, *Rec. Ind. Mus.*, **2** : 418.

Suragina (?) *latipennis* (Bellardi).

The largest and stoutest species of the three, with quite large wings, and in some respects closely resembling a species of *Rhagio*.

Locality. MEXICO, Federal District.

Identified correctly by Coquillett in the U.S. Nat. Mus. collection.

Suragina (?) *longipes* (Bellardi).

A smaller and more slender species than the above, with the wing markings in the specimen in hand more intense and uniform in colour than the other.

Locality. MEXICO, Oaxaca (*Crawford*).

Identified correctly by Knab in the U.S. Nat. Mus. collection.

Suragina (?) *concinna* (Williston).

The smallest and most slender of the three species and the most closely similar in appearance to certain species of the genus *Rhagio*.

Locality. TEXAS, Kerrville, 30.v.1906 (*F. C. Pratt*).

It is necessary to note that this species is an addition to the fauna of the United States, as it was not included by Leonard in his paper on the RHAGIONIDAE * although he had the specimen submitted to him from the U.S. Nat. Mus. as an unidentified species of *Atherix*. Coquillett labelled the specimen "*Atherix* n. sp." possibly because it lacks the yellow colour shown in the costal and subcostal cells in the figure of the wing of this species in *Biologia Centrali-Americana*.

Genus *Atrichops*, Verrall.

This genus was erected for the reception of a European species which is unknown to me, and in 1920 Brunetti removed all the Indian species which he had previously placed in *Atherix* to *Atrichops*.† He also included in his work the genus *Suragina*, but placed only one species in it on the basis of Karsch's work in 1884.‡ Verrall distinguished *Atrichops* from *Atherix* on the narrower frons in both sexes, the bare face, and the thickened hind legs. When I first examined specimens of *Suragina*, I noted that the parafacials were very much narrower than in *Atherix*, almost or quite linear, and that they were sometimes practically bare, but a careful examination disclosed the fact that there were usually some very fine hairs present, and as the lack of these hairs in related genera has not been considered as of generic or even subgeneric significance, and it did not appear to be invariable here, I disregarded it. Karsch has used the comparative widths of the frons in *Suragina* and *Atherix* as his distinguishing character, and this has been adopted by Brunetti in his key to the genera on page 104 in the work above mentioned. Without access to specimens of the European species, I do not care definitely to place *Atrichops* as a synonym of *Suragina*, but the evidence at present indicates the very great probability that they are identical. I have but one male in good condition as to the fore legs, so can only say that in it the fore tarsal claws are not elongated as in *Atherix*, but that would hardly be considered a valid generic character.

Genus *Heliomyia*, Doleschal.

This genus was founded for the reception of *ferruginea*, Dol., which is now considered as a synonym of *Chrysopilus ferruginosa*, Wied. Brunetti has given §

* 1930, *Mem. Amer. Ent. Soc.*, **7**.

† 1920, *Fauna of British India*, Diptera. **1**.

‡ 1884, *Berl. Ent. Z.*, **28** : 174.

§ 1909, *Rec. Ind. Mus.*, **2** : 425.

a list of suggested synonyms which I accept with the exception of *Leptipalpus*, Rond., which being based upon a South American species requires confirmation.

I have very carefully examined several Oriental species which might reasonably be considered as falling within the scope of this genus and find very little to support its retention as distinct from *Chrysopilus*. Brunetti evidently suspected that the enlarged and almost bare palpi was a sexual character, judging from his remarks on the page just cited, but why he should consider the acceptance of the genus without a co-ordinated male character is a matter that I cannot determine. He describes one species, *fulvidus*, which he places in *Macellopalpus*, accepted by him as a synonym of *Heliomyia*, and as he places *ferruginosa*, Wied., in the genus *Chrysopilus* on a subsequent page in the same paper (though he admits having taken a female with broad palpi which "approximate" it to *Macellopalpus*), it is difficult to know why he did not either remove that species to the latter genus or synonymise the genus with *Chrysopilus*. From a careful survey of the characters of *ferruginosa* and some other species, I feel constrained to reject *Heliomyia* as a distinct genus. The only character that might be urged for its retention, apart from the larger palpi of the female, is the bare humeral calli, but this character is not of very much value in forms that are as loosely or sparsely haired as these are, and I consider it wise to accept the species in question as forming merely a group, at most a subgenus, within *Chrysopilus*. I am inclined to consider that *fulvidus*, Brun., *flaveolus*, Big., and *ferruginea*, Dol., are all synonyms of *ferruginosa*, Wied., and that there is no reason to remove them from the next genus.

Genus *Chrysopilus*, Macquart.

Chrysopilus ferruginosa, Wiedemann.

There is considerable variation in the degree of pigmentation of the stigma in this species, but the general ferruginous colour, the whitish yellow facial protuberance, fulvous palpi, and the brownish fuscous colour of the tibiae and tarsi should readily distinguish it from its allies. The female has the frons glossy black, with the anterior margin densely white dusted, and the lateral margins very narrowly so. The wings are yellowish, more brownish apically. The eyes of the male are large, quite closely contiguous on the greater portion of the frons, and with the facets hardly larger above than on lower portion. The width of the frons in the female is less than one-half its greatest length, and there are no hairs on the glossy part. Sides of face sloping down from eyes, and with some very fine pale hairs on lower half or less. Arista hair-like, not as thick as in North American species of the genus, and microscopically pubescent.

Localities. Aru Island, and various islands in the Philippines.

Chrysopilus opacifrons, de Meijere.

Very similar in general appearance to the preceding species, but rather duller in colour, the antennae black instead of with only the third segment fuscous, the stigma more conspicuous, the apices of wings more infuscated, the apices of the basal two or three abdominal tergites blackened and the greater portion of all tergites beyond that blackened. The legs are paler, being dull brownish yellow except the apices of the tarsi. The male has the eyes separated on the frons by a distance almost as great as the width across the posterior ocelli and

the surface of frons is dull grey dusted. The eyes have the facets very little larger on upper portion than below.

Locality. Sumatra.

Chrysopilus stylatus, Walker.

The preceding species appears to be very close to, if not identical, with this one, but a re-examination of Walker's type is essential to a definite conclusion.

Rhagina, gen. n.

I erect this genus for the reception of two species described by de Meijere and originally placed in *Rhagio* (*Leptis*). The new genus is distinguished from *Rhagio* by the much reduced alula of the wing, which is practically straight on its posterior margin and has the ambient vein much stronger than in *Rhagio*, the peculiar curvature of two sections of the radius, R_{2+3} bending down and forming a quite large loop at the point where the usual stigma occurs in other genera, and the stem R_{4-5} being markedly and correspondingly bent, while the vein R_4 is rather abruptly angled off from R_5 and then bent round to proceed to the margin of the wing (fig. 1). The male before me representing the genotype has a very distinct hump on the ventral surface of the hind femur near its

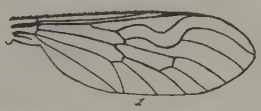


Fig. 1.—*Rhagina incurvatus* (de Meijere). Wing, marking omitted.

apex which is mentioned in the original description, and which I judge from the description of the second species occurs also in it. Only males are known, and possibly this femoral character is a sexual one. In other respects the genus is similar to *Rhagio*, but in the specimen before me the sides of the face are almost obliterated and bare.

Genotype : *Leptis incurvatus*, de Meijere.

Rhagina incurvatus (de Meijere).

One male agreeing in every detail with the original description and figure.

Locality. Java, Tjibodas, Mt. Gede (*Bryant & Palmer*). U.S. Nat. Mus.

Genus *Arthroceras*, Williston.

This genus, with *Glutops*, Burgess, and *Xylomyia*, Rondani, constitutes the subfamily Arthroceratinae of Leonard's paper on the North American Rhagionidae. The genus *Xylomyia* in his sense, which includes *Solva*, Walker, cannot be included with the two other genera in one subfamily, or family, as one might reasonably consider the latter so distinct that a family segregation would be proper. In my paper on the classification of the Diptera based on the immature stages in 1917 * I placed *Xylomyia* in Stratiomyiidae as a subfamily, accepted Xylophagidae and Coenomyiidae as distinct families, and considered *Rhagio* and its closest allies as a separate family. In view of the difference of

* 1917, Bull. Ill. State Lab. Nat. Hist., **12** : art. 3.

opinion between other authors and myself, it may be pertinent to deal briefly with the segregations and characters used for such. The reason why I placed *Xylomyia* (= *Solva*) in STRATIOMYIIDAE was that the larva is so similar that the relations between the groups could not, in my opinion, be mistaken. I now point out that both in *Xylomyia vera* and *Solva* the prosternum is complete, forming an entire chitinous ventral sclerite connecting with the lateral chitinous sections of the prothorax without the interception on each side by a membranous strip of various widths as in RHAGIONIDAE, XYLOPHAGIDAE, COENOMYIIDAE, and the genus *Arthroceras* and its allies. This character I introduced some years ago for the separation of the subfamily LAPHRIINAE from DASYPOGONIINAE in connection with some notes on Australian ASILIDAE, and I note that its use has been subsequently appropriated by one worker in that country for that purpose. I am rather inclined to accept characters of the thoracic structure as more reliable indices to the relationships of groups than the structure of the antennae, or even the venation of the wings, there being rather too many parallelisms in the two last features to justify much faith being placed in them. I therefore place the present genus and *Arthropeas*, Loew, in RHAGIONIDAE, though I am disinclined to deal with the matter of their subfamily status at this time.

Arthroceras pollinosum, Williston.

This is the genotype. It rather strikingly resembles some species of *Chrysopilus*, and the dense brownish-yellow pollen on the mesonotum heightens the resemblance, but the elongated and distinctly annulated third antennal segment readily distinguishes it. The lateral portions of the face are bare while the central bulbous portion has a few hairs on each side; the pleura are haired as in *Chrysopilus*, even to the extension of the hairs on the postnotum up to the lateral edges of the scutellum and over its entire upper disc. The fore tibiae lack the apical spur; there is one on the hind tibiae, and two on the mid pair.

Habitat. N.W. UNITED STATES.

A specimen has been sent to the British Museum.

Genus *Arthropeas*, Loew.

This genus was originally erected for the reception of a Siberian species, and two or three species have subsequently been added. I have before me specimens from Tibet which closely resemble the genotype, and I consider the species the same but the specimens belonging to varietal forms which I describe below.

All three forms are similar in general coloration and markings, being differentiated only by the markings of the wings and the following diagnosis should suffice for their distinction from each other. They may really be distinct species.

Key to varieties of sibirica, *Loew.*

1. First basal cell of wing with only a small spot of dark colour near apex, the second with the apical third dark . . . . . *sibirica*, Loew.
— First posterior cell of wing dark along posterior border, second almost entirely dark . . . . . 2.
2. Discal cell entirely yellow . . . . . *fenestralis*, var. n.
— Discal cell with apical half or more fuscous . . . . . *semifusca*, var. n.

Arthropeas sibirica, var. **fenestralis**, n.

♂, ♀. Similar to *sibirica*, but the male only has the mesonotum with a trace of the three dark vittæ, the female having hardly a sign of them.

Type, ♂, Tatsienlu, 8900 feet, 16.viii.1930; allotype, Wa-Hu Pass, 16,400 feet, 2–6.viii.1930; male paratype, Mi-Chi in Yu Long Si Gorge, 1300–1500 feet, 8.viii.1930, China-Tibet border (*D. C. Graham*). U.S. Nat. Mus.

Arthropeas sibirica, var. **semifusca**, n.

♂, ♀. Similar to the preceding variety in general coloration and also in the markings of the sexes, but with at least the apical half of the discal cell of the wings fuscous.

Type, ♂, Ja-Ze Pass, 16,000–17,150 feet, 13.viii.1930; allotype, Wa-Hu Pass, 16,400 feet, 2–6.viii.1930 (*D. C. Graham*). U.S. Nat. Mus.

The males are smaller than the females, the smallest being less than 8 mm. in length, while the females are stouter and larger, extending to 13 mm. in length.

Family Bombyliidae.

In some miscellaneous material received from the Rhodesia Museum there are specimens of some genera of this family which call for published records. They are dealt with briefly below.

Genus *Pantostomus*, Bezzi.

This genus was briefly described by Bezzi * and the genotype named but no full description has ever appeared, so far as I can discover, although intended to be published in the Annals of the National Museum of Hungary.

Pantostomus gibbiventris, Bezzi.

♂, ♀. General colour brownish fuscous, varied with reddish-brown and yellow, the apices of the abdominal tergites always narrowly pale yellow, and usually a yellow preapical

Fig. 2.—*Pantostomus gibbiventris*, Bezzi. Wing.

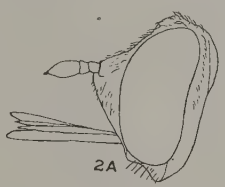


Fig. 2A, ♀ Head from side.

patch on each side of each tergite. *Head* (fig. 2A) generally reddish-brown, the antennae variable, sometimes almost black; proboscis black; frons with yellowish pile, postocular orbits with similar pile except on a narrow section in line with the humeral angles where it is pure white. Thoracic dorsum with three more or less distinct blackish vittae, quite dense and very short decumbent yellow pile except on the lateral margins where it becomes longer; upper and anterior portions of mesopleura, upper margin of the sternopleura, and the metapleura both above and below the level of the halteres with fine yellow pile. *Abdomen* subcylindrical, visible tergites 2 to 5 each with the apical margin impressed on each side and the disc with a large dent or impressed area on each side, causing the disc to appear as with three humps, the centre of each tergite usually black to middle, or beyond,

* 1922, Broteria, (Zool.), **20** : 79.

and the apex yellow; pile white on each side of each tergite and on the anterior central portion of disc over the depressed areas, elsewhere yellowish or brownish. *Legs* tawny yellow, the femora generally blackened. *Wings* hyaline. Halteres brownish yellow. Frons of male at vertex about one-eighth of the head width, about one-sixth in female, very distinctly elevated at ocelli, the latter rather inconspicuous because of their being situated on the sides of the elevation and consequently vertical, width of frons at anterior extremity over twice as great as at vertex; a distinct hump on each side between the antennae and eye; mouth carried upward almost to the antennal insertions causing the face to be practically eliminated; proboscis slender and styliform, when retracted extending to just beyond anterior extremity of the mouth; antennae short, basal two segments about as long as thick and subequal, third longer than the basal two combined, tapered on apical half, the apex with an almost indistinguishable style; back of head with a small deep pit a little below vertex. Wing-venation as fig. 2, the fork of third vein (R_4) sometimes with a short spur vein at the basal curve projecting backward and slightly upward, indicating to my mind the possibility that at times it may constitute a connecting cross-vein between that vein and the second (R_{2+3}).

Length, 5–9 mm.

Localities. Two small males and one large female, S. Rhodesia, Mulungwane Mts., 12.ix.1924 (Rhodesia Museum), one large male, Redbank, 1.ix.1926 (*R. H. R. Stevenson*, Rhodesia Museum). A specimen will be sent to the British Museum.

Originally recorded from Willowmore, South Africa, from one specimen.

Despite the striking disparity in size of the specimens I feel that all belong to the same species as no characters of moment are available for their separation, though the large male and female both possess the spur vein on the fork of third vein and the two small males lack this.

Genus *Gnumyia* Bezzi.

1922, Ann. S. Afr. Mus., **18** : 82.

This genus was erected for the reception of a single species which Bezzi had but one specimen of. The genus is a very striking one in the matter of cephalic structure, the bulged-out face with its yellow colour and dense hairs making it a conspicuous form in the family.

Gnumyia brevirostris, Bezzi.

I present figures of the wing and head of this genus (fig. 3) which have not previously been published.

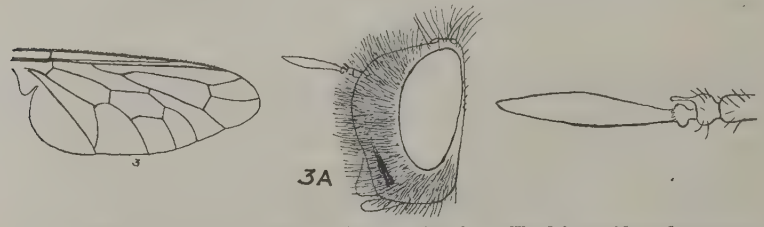


Fig. 3.—*Gnumyia brevirostris*, Bezzi. Wing. Fig. 3A, ♂ Head from side and antennae.

Three specimens, S. Rhodesia, Matopos, 14.ix.1930 (Rhodesia Museum), submitted by Dr. G. Arnold for identification along with the previous species. One specimen will be sent to the British Museum.

NOTES ON EXOTIC DIPTERA (2)

By John R. Malloch.

Family Cyrtidae.

Genus *Psilodera*, Gray.

Psilodera fasciata (Wiedemann).

Two males of this species are before me. A striking character of the species, and probably of the genus, consists of the fusion of the second to fourth tergites and sternites of the abdomen on their lateral edges so that there is no visible connecting membrane. The spiracles of these segments are situated in the edges of the tergites as is the rule in this family. The proboscis extends to slightly beyond apex of abdominal venter.

Locality. S. Rhodesia, Chirinda Forest, October 1926 (*G. Arnold*, Rhodesia Museum). One specimen will be returned to the Rhodesia Museum and the other sent to the British Museum.

Family Dolichopodidae.

Genus *Campsicnemus*, Haliday.

Campsicnemus bryanti, sp. n.

♂, ♀. *Head* black, frons glossy, with a purple suffusion on sides, occiput aeneous, with greyish dust which becomes quite dense on the lower half, the wide lower third of face with golden brown pile; antennae and palpi black; upper postocular setulae black, the finer hairs on lower half and on occiput pale; eyes with very dense regular pale hairs. *Thorax* black, the mesonotum glossy, with a slight aeneous or purplish lustre, the scutellum glossy purplish-black; pleura quite densely whitish-grey dusted; squamae yellow, their fringes pale. *Abdomen* glossy black, with very pronounced blue to purple reflections, sides of first visible tergite and the extreme lateral margins of other tergites greenish-grey dusted; hypopygium black. *Legs* black, slightly grey dusted, knees of fore pair and the entire mid femur except for a fuscous streak below at base fulvous yellow; the long slender process on the basal segment of fore tarsus of male also fulvous yellow. *Wings* hyaline, veins black, with a slight indication of a dark spot on the fourth vein beyond the outer cross-vein. Knobs of halteres yellow. Several black bristles below the vertex in continuation of the postocular series, the ocellar pair and one pair of vertical bristles long and strong; face of male linear on upper two-thirds or more, of female about as wide on upper two-thirds as width between ocellar bristles; second segment of arista about four times as long as thick in both sexes. Acrostichal setulae biseriate, closely placed, the dorsal bristles quite long, the humeral incurved; scutellum with two widely spaced margin bristles and usually one fine hair between each and the lateral angle and one or two similar hairs between each and the apex. Abdomen cylindrical in male, ovate in female, the hypopygium of male rather small. Legs long, the fore pair in male as in fig. 4, the tarsi of fore legs in female normal, but the tibiae with one antero-dorsal and some postero-dorsal and posterior bristles; mid tibiae in both sexes with one or two ventral and several antero-dorsal and postero-dorsal bristles; hind femur with one preapical anterior bristle; hind tibiae with one or two antero-ventral and four or five antero-dorsal and postero-dorsal bristles; hind tarsi normal.

Length, 3–4·25 mm.

Type, male, allotype, and 3 paratypes, CANADA, Fort Churchill, Manitoba, 25.vi.1930; 11 paratypes, same locality, 22.vi.1930 (*O. Bryant*).

Dedicated to the collector who has done so much to make the fauna of the North-West known to science.

This species has its nearest ally in *americanus*, van Duzee, described from Healy, Alaska, but in the latter the male has the arista feathered with white hairs at apex, there are several scale-like bristles on the dorsal surface of the fore tibia on its basal half, the process on the second segment of the fore tarsus is about equally wide on its entire extent, and similarly haired throughout, the same segment has no apical slender process on the underside, and the tarsal claws are about equal in length and strength; the fore femora are yellow below and black above, and the fore tibiae are yellow. The European species *compeditus*, Loew, has the basal segment of the antenna yellow and agrees in most particulars with *americanus*, but the second segment of the fore tarsus has a process as in *bryanti*, and the long hairs on that tarsus are much less extensively distributed. The legs in *compeditus* are yellow, with the fore femur, and sometimes the mid pair with their dorsal and posterior surfaces blackened, and the tarsi fuscous.

FIG. 4.—*Campsicnemus bryanti*, sp. n. Mid femur, tibia, and tarsus.

A male and female paratype of *bryanti* will be deposited in the British Museum on instructions from the collector, the type will probably be deposited in the U.S. Nat. Mus. and the other specimens distributed to museums in North America.

It must be noted that in *bryanti* the aristae are very slender at apices and thus quite distinct from those of the male of *americanus* in which the apices, besides being white, are apparently broadened by a dense fringe of very closely placed white hairs.

Hawaiian Species.

Grimshaw in *Fauna Hawaiiensis* described three species of this genus, and I have before me three additional species a key to all of which I present below.

Key to the Species.

1. Mid tibia with about four rather strong dorsal and about eight finer ventral bristles on almost entire length, which average about three times as long as the diameter of the tibia . . . . . *fimbriatus*, Grimshaw.
— Mid tibia without long ventral bristles . . . . . 2.
2. Mid metatarsus distinctly longer than second segment and without a well-developed apical thorn or spur; mid tibia with a rather strong and short black bristle close to base on anterior surface, and no group of bristles on anterior side beyond middle . . . . . *inermipes*, sp. n.

— Mid metatarsus not as long as second segment, and with a well-developed apical spur or spine which may be at right angles to segment . . . . . 3.
3. Mid tibia as thick as mid femur and peculiarly distorted or twisted at apex; mid metatarsus with an apical rounded projection over the base of second segment in addition to the black posterior spur . *distortipes*, Grimshaw.
— Mid tibia not nearly as thick as the thickest part of mid femur and not noticeably twisted at apex; mid metatarsus not projecting over base of second segment . . . . . 4.
4. Mid metatarsus not half as long as second segment, the apical spur curved; legs entirely pale yellow . . . . . *congregatus*, sp. n.
— Mid metatarsus a little shorter than second segment, the apical spur straight 5.
5. Legs entirely pale yellow; mid metatarsus with the spur yellowish-brown and projecting along the base of second segment . . . . . *recta*, sp. n.
— Legs pale yellow, apex of metatarsi and all of remaining segments of all tarsi darker; mid metatarsus with the apical spur black, straight, and projecting at right angles to segment . . . . . *calcaratus*, Grimshaw.

Campsicnemus congregatus, sp. n.

♂. Very similar to *calcaratus*, Grimshaw, in general coloration, but the legs are entirely testaceous yellow. The back of the head and the frons are greenish-black with greyish dust which obscures the ground-colour. The antennae are entirely pale yellow, and the aristae fuscous. The entire body is pale testaceous yellow, with very slight yellowish dusting, and the bristles and hairs of thorax are yellowish. Aristae almost bare, thickened at extreme bases and situated near base of upperside of the elongate conical third antennal segment, the latter very densely pale haired; face obliterated on more than the upper half, anterior portions of eyes with the facets enlarged. Acrostichal setulae quite well developed, biseriate; scutellum with the usual two marginal bristles. Abdomen cylindrical; hypopygium small. *Legs* not noticeably elongated; fore femora and tibiae without bristles; mid femur thick at base rapidly thinning to beyond middle, the apical third or more slender, the postero-ventral surface with about six bristles which are long basally and become shorter as the femur becomes attenuated and do not reach beyond the apical third, the antero-dorsal surface with a group of fine pale bristly hairs on the anterior and antero-dorsal surfaces which extend almost the entire length and are directed apically; mid tibia slightly thickened on apical third or less, with the fine hairs mostly erect and one bristle on anterior and another on posterior side near apex, and a group of short black bristles about one-third from apex on antero-ventral surface which consist of about three series; mid metatarsus slightly curved, not half as long as second segment, with the antero-dorsal angle slightly produced and tipped with a strong curved black thorn; hind femur normal, with a preapical anterior bristle; hind tibia normal, with two or three bristles on the antero-dorsal and postero-dorsal surfaces and usually one on antero-ventral; basal segment of hind tarsus about two-thirds as long as second segment. *Wings* rather slender ovate.

Length, 2 mm.

Type, HAWAII: Palolo, Oahu (*O. H. Swezey*).

Campsicnemus inermipes, sp. n.

♂, ♀. Very similar to the preceding species in general coloration, differing only in some structural details of the male. The mesonotum is practically devoid of acrostichal hairs. The mid femur has the fine anterior and antero-dorsal hairs confined to the apical half; the mid tibia is hardly thickened beyond middle and has a single very short setula on the antero-ventral surface near apex instead of the triseriate group as in the preceding species; the mid metatarsus is not curved nor thicker than the second segment and is about six-sevenths as long as the latter, with a straight apical forwardly directed brownish spur;

hind femur without a preapical antero-ventral bristle; hind tibia as in the preceding species; hind metatarsus longer than in that species but still not as long as the second segment. Wings more rounded at apex than in the preceding species.

Length, 2 mm.

Type and allotype, the latter lacking the head, HAWAII: Kaumuahona, Oahu, 1.xii.1919 (*O. H. Swezey*).

Campsicnemus rectus, sp. n.

♂. A darker species than the preceding two, the general colour more brownish yellow, with the abdomen largely dark brown, and the third antennal segment browned. Thoracic bristles black. A stouter species, with no distinct acrostichal hairs. The mid femur is thick on basal two-thirds, and slender on apical third or less, with the usual series of postero-ventral bristles, but no antero-dorsal or anterior bristly hairs; the mid tibia is normal, with a series of short erect fine hairs on the basal two-thirds on the postero-ventral surface, and a short bristle near base on antero-dorsal surface; mid metatarsus longer than second segment, without an apical spur and with the posterior hairs a little longer than usual; hind femur with an anterior preapical bristle; hind tibia with bristles as in *congregatus*; hind metatarsus about three-fourths as long as second segment. *Wings* narrowly ovate.

Length, 3 mm.

Type, HAWAII: Mt. Olympus, Oahu, 25.ii.1922 (*E. H. Bryan, Jr.*).

Genus *Sciapus*, Zeller.

Sciapus ogilvii, sp. n.

♂. Ground-colour of *head* and *thorax* entirely obscured by dense whitish-grey dust which on the entire face and frons becomes almost tomentum; antennae and palpi testaceous yellow, aristae brown; postocular cilia pale. *Thoracic dorsum* with a very faint grey line on each side of the acrostichals anteriorly; scutellum with a faint green tinge showing through the pale dust. *Abdomen* testaceous yellow, quite densely grey dusted, with the apices of tergites narrowly fuscous and a fuscous subtriangular mark at base of each tergite on basal half, the infuscation becoming more general apically; hypopygium brownish, apices of forceps black. *Wings* hyaline, veins brown, the anterior branch of fourth being slightly clouded along its course on basal half. Legs including the coxae testaceous yellow, apical two segments of fore tarsi, and sometimes the extreme apex of third, dark brown. Squamae and fringes yellow. Third antennal segment almost triangular, the arista almost apical, with second segment about three times as long as thick; face at upper margin one-third as wide as head, narrowed below, at centre about 1·5 as long as its upper width. Thorax with the acrostichals and dorso-central quite strong; scutellum with the usual two bristles, and a fine hair on side basad of each. First visible tergite with rather long apical bristles which are shortest centrally; all hypopygial lamellae slender. Legs without any abnormal armature or developments, the fore tarsi with the segments normal. *Wings* of the normal form, without exceptional marginal armature, fork of fourth vein leaving at a right angle and narrowly rounded above, from close to the angle running almost parallel and rather close to the third vein to margin of wing, the lower branch extending about two-thirds of the distance to margin; outer cross vein hardly curved.

Length, 4–5 mm.

Type and one paratype, No. 664, BERMUDA, Agr. Sta., Elba Beach, south shore, September 1925 (*L. Ogilvie*).

Distinguished from its allies by the yellow legs and antennae and simple fore tarsi, as also the densely dusted face, frons, and mesonotum.

Family Syrphidae.

Genus **Pogonosyrphus,** n.

Generic characters:—Habitus similar to that of *Milesia*, Latr., but differing markedly from that genus in many characters. Wing-venation as fig. 5, marginal cell open, anal cell closed and with an abruptly angulate petiole. Head in profile as fig. 6, the eyes bare, in male with a short subcontiguous stretch about midway between anterior extremity of frons and anterior ocellus. Thorax without bristles, postscutellum very weakly developed. Abdomen parallel-sided, tergites 2 to 4 longer than wide when viewed from above, their sides with fine curled hairs which become longer as they approach apex of abdomen and particularly noticeable on fourth tergite; sternites also with rather dense soft erect hairs. Hind femur with a preapical process or spur on antero-ventral surface; tibiae of mid and hind legs with dense long soft hairs on the ventral surfaces, longest on the postero-ventral side.

Genotype: the following species:—

Pogonosyrphus arnoldi, sp. n.

♂. General colour castaneous brown, dorsum with brownish dust, the abdomen less distinctly dusted than the mesonotum but like it with quite dense decumbent yellowish

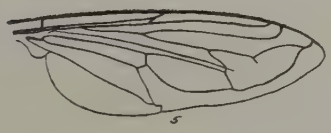


Fig. 5.—*Pogonosyrphus arnoldi*, sp. n. Wing, markings omitted.

Fig. 6.—*Pogonosyrphus arnoldi*, sp. n. Head from the side.

hairs which partly obscure the ground-colour. *Frons* with dense yellowish-brown dust, the face with the dusting paler, more nearly whitish; antennae and the aristae brownish-yellow. *Mesonotum* with slight traces of three or five reddish-brown vittae anteriorly. Second, third and fourth tergites each with a yellow transverse mark on each side at anterior margin, on second these marks are almost connected in centre and are carried along each lateral edge to, or almost to the apex, on third the yellow is less extensive on sides but usually connected on anterior margin, and on fourth the yellow is much reduced, usually consisting of a small subtriangular mark on each side near anterior margin; surface hairs golden brown on dorsum, yellow on sides except at apices where they are black, black on hypopygium and on apical half of venter, yellowish on basal half of latter. *Legs* castaneous brown, tibiae pale yellow on dorsal surfaces, fuscous elsewhere, tarsi darker than femora, but their extreme apices more orange-red; hairs yellowish. *Wings* hyaline on posterior half and at apex, brownish-yellow in front of spurious vein and fuscous over the inner cross-vein and from there to costa and slightly over the third vein but not to apex of wing. Squamae white. Halteres pale yellow.

Head slightly wider than thorax, frons at vertex about one-ninth of the head width, the ocelli slightly elevated and in a triangle, the posterior pair as far from vertex as width of frons at that point, the surface with many fine erect hairs, linear portion of frons not half as long as distance from its upper extremity to anterior ocellus; parafacials with very minute fine erect hairs, appearing bare except under a high magnification (X 34); aristae bare. *Prosternum* with very minute fine hairs, the pleural sclerites except those of meta-

thorax finely haired; scutellum with a fine impression round the apex causing it to have a fine rim, the surface finely haired. *Fore legs* normal, the tarsi slightly thickened; mid femora slightly thickened and with dense hairs on ventral surfaces, longest on the antero-ventral edge where they are as long as the ventral tibial hairs; hind femora thickened and curved, the preapical antero-ventral process pointed, the ventral surfaces with dense fine erect hairs; hind tibiae slightly curved; fourth segment of all tarsi almost V-shaped the fifth set in the deep apical notch of fourth; claws quite long and strong, abruptly curved at about two-thirds from apex.

Length, 22–25 mm.

Type, and one paratype, S. Rhodesia, Chirinda Forest, October 1926 (*G. Arnold*), one paratype, same locality, November 1930 (*G. Arnold*).

All specimens the property of the Rhodesia Museum, but one will be returned there, one sent to the British Museum, and one retained by the author.

This genus runs down fairly well to *Macrozelima*, Stackelberg,* which has as its genotype *bidentata*, Stackelberg, from the Palearctic region, but the latter, which may be the same as *hervei*, Shiraki, has a pair of processes at about the same distance from the apex of the hind femur, the petiole of the anal cell of wing straight, and the facial profile different.

Dr. Arnold was particularly anxious to have an identification for the species because of the fact that it is a very close mimic of certain Aculeate Hymenoptera that occur in the same locality, even to the flight and peculiar buzzing sound when on the wing. He informs me that the first specimen he took was taken under the impression that it was a wasp in which group he is particularly interested.

KEYS TO SOME INDIAN GENERA OF CARABIDAE.—I. GENUS *CYMINDIS*

By H. E. Andrewes, F.E.S.

1(12). Upper surface pubescent and very distinctly punctate.

2(11). Elytra with the basal border entire, or very nearly so, the surface not very finely punctate.

3(8). Elytra with an oblique pale vitta running inwards and backwards from the shoulder, or at least with a pale spot on the shoulder; the marginal channel and sometimes interval 9 also pale.

4(5). Elytra very flat, strongly contracted in front, the striae moderately deep, the intervals each with a single irregular row of punctures down the middle; humeral vitta reaching basal third of elytra; interval 9 pale. Length 9–11 mm. . . . . *championi*, Andr.†

5(4). Elytra moderately flat, not strongly contracted in front, the intervals irregularly punctate; interval 9 dark.

6(7). Prothorax finely punctate, all the punctures of the same size; elytral striae very lightly impressed, formed largely, at least in front, by the fine punctures, the outer striae very faint. Length, 8–10 mm. *babaulti*, Andr.‡

7(6). Prothorax finely punctate, the punctures of different sizes; elytral striae, even the outer ones, distinctly impressed, the punctures in them somewhat indistinct. Length, 7–8·5 mm. . . . . *hingstoni*, Andr.§

* 1930, *Konowia*, **9** : 229.

† 1928, *Ann. Mag. Nat. Hist.*, (10) **2** : 589 = *alticola*, Andr. (*nec* Casey), 1926, *Ent. Mon. Mag.* **62** : 70 and 79 (Kumaon and Tibet).

‡ 1924, *Mission Prov. centr. Inde Babault, Carab.* : 113, t. 4. f. 6 (Kashmir).

§ 1930, *Trans. Ent. Soc. Lond.*, **78** : 42 (Tibet).

8(3). Elytra without any pale humeral vitta or spot; the marginal channel sometimes pale.

9(10). Vertex fairly closely punctate; elytra very flat; colour almost entirely black or piceous, including the marginal channels of both the prothorax and the elytra. Length, 9–11 mm. . . . *mannerheimi*, Gebl.*

10(9). Vertex almost impunctate; elytra moderately convex; colour piceous, the legs, antennae (except towards apex), and marginal channels of both the prothorax and the elytra pale. Length, 7–8·5 mm. *longstaffii*, Andr.†

11(2). Elytra with the basal border not extending inwards beyond stria 6; the upper surface very finely punctate; elytra each with both a pale humeral vitta and an apical spot. Length, 7·75–8·5 mm. *psammodes*, sp. n.

12(1). Upper surface glabrous, minutely and very sparsely punctate; prothorax dark red, as long as wide; elytra black or piceous with a ferruginous margin. Length, 8–9·5 mm. . . . . *glabrella*, Bates.‡

Note. Two species from the Pamir, unknown to me in nature, have been omitted from the above key, viz. :—

obsoleta, Jakowleff, 1885, *Hor. Soc. Ent. Ross.*, **19** : 288.
attenuata, Jakowleff, 1887, *Hor. Soc. Ent. Ross.*, **21** : 150.

Cymindis psammodes, sp. n.

Length, 7·75–8·5 mm.

Ferruginous : margins of venter piceous; elytra black, each with an oblique vitta, about three intervals wide, running inwards from the shoulder to a little beyond middle, an oblong apical spot on intervals 2–4, interval 9, and the marginal channels more or less flavous. Surface with a dense short erect pubescence.

Head moderately convex, frontal foveae obsolete, eyes moderately prominent, antennae slender, reaching basal fifth of elytra, apical joint of labial palpi ♂ only slightly dilated, surface finely and rather densely punctate. *Prothorax* moderately convex, cordate, more than a third wider than head, a third wider than long, base as wide as apex, rather strongly produced at middle, with its sides oblique, sides rounded and a little explanate, gently sinuate near base, the hind angles very sharp, but obtuse, and a little reflexed; median line and front transverse impression very slight, hind impression and basal foveae moderately deep, surface finely and densely punctate, a little less densely on disk. *Elytra* rather flat, subquadrate, a half wider than prothorax and about as much longer than wide, border not extending inwards beyond stria 6, apex inconspicuously truncate, with a slight re-entrant angle; striae moderately impressed, finely and closely punctate, 1 and 2 arising in an umbilicate pore; intervals nearly flat, very finely and fairly closely punctate, the punctures irregularly disposed. No appreciable microsculpture in either sex. Claws pectinate on the basal half only.

Karachi (*T. R. D. Bell*), 11 ex. The type is in my collection.

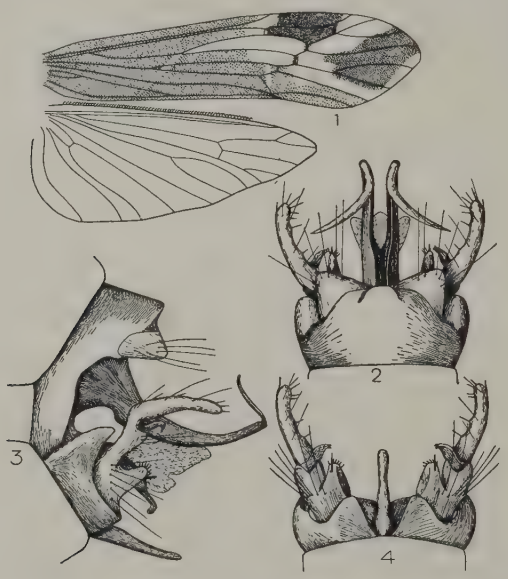
The species of this genus frequent two very different habitats, namely low-lying sandy wastes and mountain ranges. Hitherto all the species known from the Indian region have been found in the Himalayas, and that described above is the first among the sand frequenters, though others will probably be met with as time goes on in the entomologically little known sandy tracts of western India.

* 1843, *Bull. Acad. Imp. Sci. St. Petersb.*, **1** : 36 (Kashmir, Pamir, Turkestan).
† 1923, *Ann. Mag. Nat. Hist.*, (9), **11** : 277 (Tibet).
‡ 1878, *Proc. Zool. Soc. Lond.*, **46** : 719 (Kashmir).

MORE AFRICAN LEPTOCERIDAE (TRICHOPTERA).

By Martin E. Mosely, F.E.S.

This paper continues the series describing new species of Trichoptera mainly sent to the Imperial Institute of Entomology by its correspondents and presented to the British Museum. A paper dealing with the two Leptocerid genera, *Leptocerina* and *Triaenodella* has already been published in 1932, *Annals and Magazine of Natural History* (10) **11** : 297–313, and the present paper completes the descriptions of new forms belonging to this family from Africa which were included in the collections. Of special interest is the *Homilia* species, owing to the remarkable form of the upper penis-cover, which is bifurcate, each fork being two-jointed.



Figs. 1–4.—*Homilia grandis*, sp. n. ♂. 1, wings; 2, genitalia from above; 3, from the side; 4, inferior appendages, etc. from beneath.

It serves a useful purpose, when describing new species from a particular country, to recapitulate all the existing described species belonging to the same genera from that country, and I propose to do this in connection with this paper. A list will be found at the end giving these particulars.

The figures in this paper have been drawn by Mr. D. E. Kimmins.

Homilia grandis, sp. n. Figs. 1–4.

Head ochraceous clothed with whitish hairs; antennae very pale ochraceous with dark annulations and a small whitish patch above each ring covering about a quarter of the joint; palpi ochraceous clothed with white hairs. *Wings.* Anterior brownish with white clear spaces; there are diagonal white streaks formed by the presence of white hairs, one

extending from the base of the discoidal cell back to the lower margin of the wing; another, crossing the wing and arising from a whitish spot at the junction of the sub-costa with the costa, meets the lower margin at the arculus. Posterior wings hyaline. *Genitalia* ♂. Terminal dorsal segment produced in the centre; superior appendages from above broad, short and triangular, nearly meeting at their bases, broad and triangular from the side; below them arises a bifurcate upper penis-cover, each fork jointed at its extremity to a corneous process curving upward and outward; from the side, upward and forward. Beneath the penis-cover is a short, stout, membranous, foliated penis; beneath this is a strongly chitinised lower penis-cover broad at the base, trough-shaped with the apex turned sharply downward. Inferior appendages trifurcate; from above the upper fork is long and finger-shaped, outer margin convex, inner concave and serrate; towards the base are seen two small forks arising at the inner margin, the lower fork rather broad at the base, conical with the apex which is armed with a group of stout spines, approaching that of the central fork, which is rather more slender; from the side, the upper fork is directed tailward with a nearly right-angled bend towards the middle, lower margin deeply excised at the bend to make a shoulder from which the small middle fork appears as a hook whose apex is directed downward; the lower fork arises at the base of the appendage and is short, rounded and directed backward with stout bristles on its upper and outer margins and a strong spine arising from near the lower margin towards the apex. Terminal ventral segment widely and strongly sinuous with a long finger-like ventral process arising from the base of the segment at the centre; from the side, the segment is broad and short, upper margin convex and produced beyond the lower, apical margin concave, ventral process directed slightly downward.

♀. Unknown.

Length of anterior wing, 11 mm.

Madagascar, 5.ix.1915 (*G. K. Kestell Cornish*).

Type ♂, with the abdomen mounted in balsam, in the collection of the British Museum. This Madagascan species is considerably larger than the single European species known. It is remarkable in the jointed upper penis-cover. I do not remember seeing such a formation in any other species, no matter what the genus or family.

Oecetis punctata, sp. n. Figs. 5–9.

Head and thorax testaceous; palpi and legs pale yellow. *Wings* greyish yellow, anterior with a dark line along the cross-veins of the anastomosis: a dark spot at the base of fork 5 and another at the arculus. *Abdomen* testaceous with punctate patches on the 7th and 8th tergites as in *notata*, Rbr., and *setifera*, Ulm. *Genitalia* ♂. Margin of the last dorsal segment bearing at its centre two small membranous parallel processes; superior appendages from above spindle-shaped, covered with widely separated strong hairs; from the side rather narrow with the bases constricted, curving slightly downward; between them is a median process consisting of two slightly curved plates, broad from the side and curving slightly downward; from above they are joined at their base and curve inwards so that their apices meet each other; intermediate appendages, of which one is broken away in the type, from above very broad, truncate, apical angles bearing horns, the outer much the longer resembling a cow's horn; from the side the longer horn is elbowed sharply downward and directed slightly backward, the shorter horn directed backward. Inferior appendages from the side, wide at the base with sub-acute apices curving slightly upward; from beneath they are wide at the base curving inwards towards each other like the jaws of a pair of calipers. Penis short and membranous; lower penis-cover very wide forming a shallow trough curving slightly downward, apex truncate.

Length of anterior wing, 8 mm.

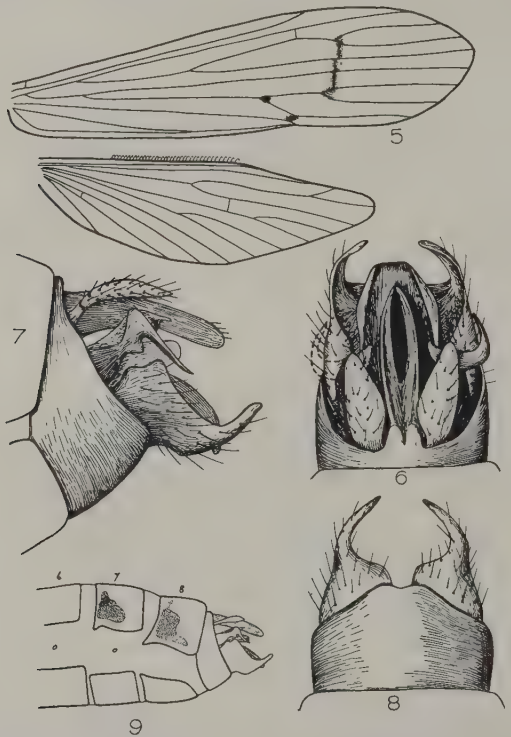
Uganda : Nanbudzidzu, 30.i.27 (*G. L. R. Hancock*).

Type ♂, abdomen in balsam, presented by the Imperial Institute of Entomology to the British Museum Collection.

Setodes neavei, sp. n. Figs. 10–15.

This species in its general appearance resembles *Setodes interrupta*, F.

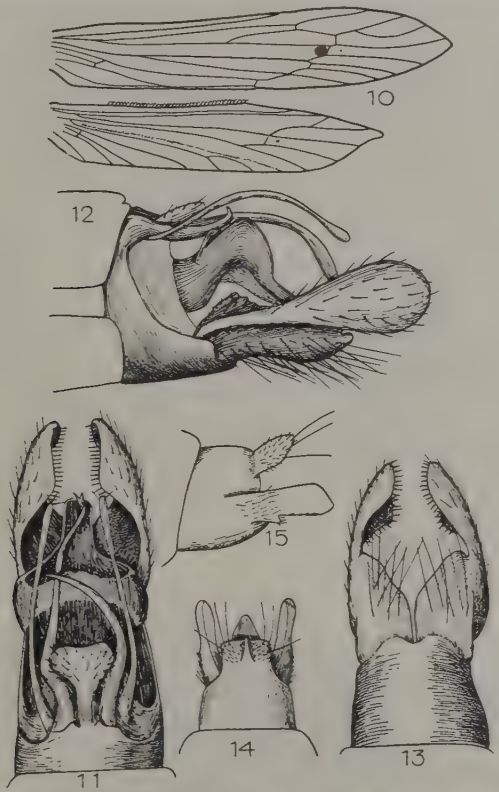
Head black; antennae dark fuscous annulated with white towards the base and basal quarter of its length; palpi dark fuscous clothed with white hairs. *Wings* narrow and



Figs. 5–9.—*Oecetis punctata*, sp. n. ♂. 5, wings; 6, genitalia from above; 7, from the side; 8, inferior appendages from beneath; 9, terminal abdominal segments from the side.

acute at the apices, particularly the posterior. Anterior, dark chocolate-brown with various patches of silvery white due to the presence of thickened white hairs; one conspicuous patch at the arculus another between this and the base of the wing, and a few scattered white hairs towards the apex; posterior wings greyish-brown. *Legs* dark fuscous clothed with adpressed silvery hairs. *Genitalia.* ♂. At the centre of the margin of the last dorsal segment are two minute projections; dorsal plate, narrow at the base, short and dilating widely to a truncate apex; superior appendages long, very slender, apices

dilated, arching slightly downward; intermediate appendages rather more strongly chitinised than the superior, asymmetric, the one long and slender, curving downward, the other shorter, bent at right-angles so that it crosses the longer midway. Of three examples examined, in two, the left-hand, and in the third, the right-hand appendage crosses the other; in the example figured the apex of the long left-hand appendage is twisted and forked, but in the other examples it is simple. Penis from the side very stout at the base, apex bent downward at right angles midway. From above it is very broad, the outer margins somewhat elevated so that the intermediate appendages rest on its



FIGS. 10–15.—*Setodes neavei*, sp. n. ♂. 10, Wings; 11, genitalia from above; 12, from the side; 13, inferior appendages from beneath; 14, ♀ genitalia from above; 15, ♀ genitalia from the side.

upper surface in a kind of trough. It may be that the structure shown in the figure is a combination of penis and penis-sheaths. Inferior appendages very large and long; from the side the basal margin is somewhat dilated, then there is a hook-shaped excision midway and the apex is produced in a dilated nearly circular process. From above, the appendages appear as narrow concave plates with truncated apices inclining towards each other; from beneath, the bases of the appendages are very wide and approach each other leaving a deep narrow cleft between; this cleft continues for a short distance and then the two inner margins widely diverge until, about midway, they are excised so that the terminal

portions of the appendages proceed from constricted stems to slightly broadened and truncate apices which are lined with short bristles.

♀. Last dorsal segment produced in a rounded plate with a small pointed projection arising at the centre of its apical margin; from the side it is directed slightly upward; beneath these are two plates which from the side appear nearly rectangular; terminal ventral segment produced to an acute apex.

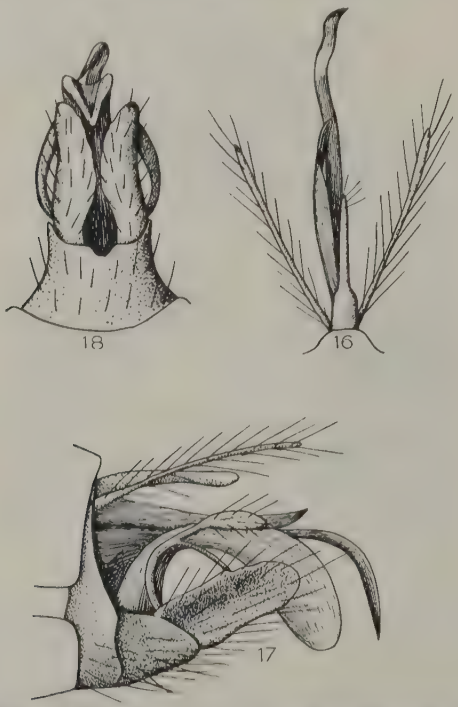
Length of anterior wing, ♂, 6 mm.

" " " ♀, 4 mm.

Type ♂, NYASALAND: Mt. Mlanje, 11.xii.1912 (*S. A. Neave*).
Paratypes, same locality, 5.xii.1912–7.i.1913.

Triaenodes difformis, sp. n. Figs. 16–18.

Head fuscous with yellowish clothing; antennae, basal joint pale fuscous, remaining joints the same colour with darker annulations; palpi fuscous. *Wings.* Anterior clothed



FIGS. 16–18.—*Triaenodes difformis*, sp. n. ♂. 16, dorsal process, superior appendages and upper penis-cover from above; 17, genitalia from the side; 18, from beneath.

with dense fulvous pubescence; posterior less densely clothed and darker. *Legs* light fulvous. *Abdomen* ochraceous, darker above. *Genitalia* ♂. Arising from a thimble-shaped base is a slender dorsal process with a group of long hairs at the apex. This process is shorter than the superior appendages which are long and slender, clothed with long

hairs and arise on each side and below it; towards the base of the superior appendages arises the upper penis-cover, which is asymmetric and consists of two spines, very broad from above, both long and ribbon-shaped, somewhat twisted, one about three-quarters the length of the other, lying over it with the apex directed slightly upward: the longer with the apex bent over at right-angles and directed downward. Penis long and stout, curving downward with a deep groove along its upper surface, apex from the side, somewhat dilated; it is possible that a lower penis-cover may be attached, though I am unable to separate it in the dried examples. Inferior appendages trifurcate; there is a slender upper branch somewhat sickle-shaped carrying a very slender middle branch arising midway and arching downward; the third and lowest branch is stout and almost rectangular projecting slightly further backward than the upper branch; from beneath, inner margins sinuous, nearly touching each other midway, diverging towards their apices. Margin of the last ventral segment sinuous with the centre excised.

♀. Unknown.

Length of anterior wing, ♂, 7 mm.

Uganda: Bulanbuli, 19.viii.1925 (*G. L. R. Hancock*).

Type ♂, presented by the Imperial Institute of Entomology to the British Museum.

The following are the described African species of the genera *Homilia*, *Oecetis*, *Setodes*, and *Triaenodes*:—

Homilia pallida, Navás (4).
„ *vestita*, Navás (7).
„ *grandis*, sp. n.
Oecetis acuta, Ulm. (15).
„ *gradata*, Ulm. (13).
„ *appendiculata*, Ulm. (13).
„ *setifera*, Ulm. (12).
„ *maculipennis*, Ulm. (12).
„ *virgata*, Ulm. (10).
„ *excisa*, Ulm. (9).
„ *montana*, Ulm. (14).
„ *fasciata*, Lestage (2).
„ *pangana*, Navás (6).
„ *punctata*, sp. n.

Setodes gracilis, Ulm. (11).
„ *hargreavesi*, Ulm. (15).
„ *sierraleonana*, Ulm. (15).
„ *squamosa*, Mosely (3).
„ *nearei*, sp. n.
Triaenodes elegantula, Ulm. (10).
„ *albicornis*, Ulm. (8).
„ *hastata*, Ulm. (10).
„ *africana*, Ulm. (9).
„ *serrata*, Ulm. (11).
„ *palpalis*, Banks (1).
„ *tinnelina*, Navás (5).
„ *difformis* sp. n.

The numbers against these species refer to the following list of references, and indicate the papers in which the original descriptions were given.

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TWO NEW GENERA AND ONE NEW SPECIES OF JAPANESE AND FORMOSAN TORTRICIDAE

By Prof. Syûti T. Issiki, F.E.S., and Herbert Stringer.

Gnorismoneura, gen. nov.

Type *G. exulis*, sp. n.

Antennae ♂ finely ciliated, ½. Labial palpi moderate, porrect; second segment thickly clothed; terminal segment smooth, half as long as second. Head roughly scaled.

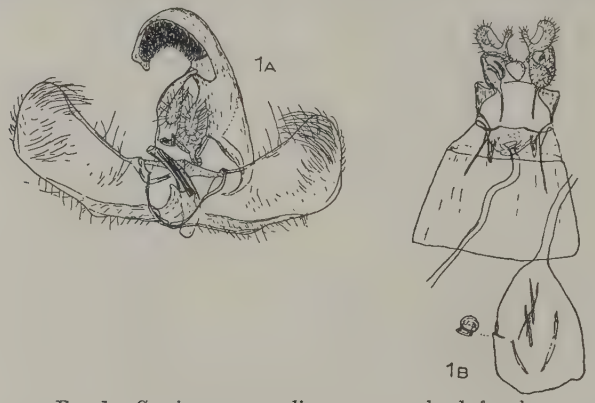


Fig. 1.—*Gnorismoneura exulis*, sp. n., *a*, male; *b*, female.

Thorax with posterior crest. Fore-wings without costal fold; 12 veins, 2 from ¾, 3–4 short stalked, stem from lower angle of cell, 5 separate, 6 remote and parallel with 5, 7–8 long-stalked, 7 to termen, 8 and 9 approximate at base, 9, 10, 11 equidistant, 11 from middle of cell. Hind-wings ♂ with a distinct short fringe of raised scales on vein 1*b*; 8 veins, 2 from ⅔, 3–4 short-stalked, 5 separate, 6–7 short-stalked.

Male genitalia with harpe simple; cucullus not differentiate, sacculus only narrowly thickened; transtilla in the form of a narrow belt; tegumen thick, strongly built; uncus extremely robust, apex not divided, curving downward, ventrally covered with dense hairs; socii developed, finger-like, hairy; gnathos forming a sub-anal plate; aedeagus moderate. Female genitalia with a pair of processes, one on each ovipositorial pad, the proximal areas of each pad heavily chitinised; the ducts are without chitinous strip and moderately long; bursa with one broad flattened signum.

Allied to *Leontochroma*, Wlsm., from which it differs in the separation of veins 6 and 7 in the hind-wings, in the absence of the fringe of scales on vein 1*b*, and in the genitalia.

Gnorismoneura exulis, sp. n.

♂, ♀, **13–15 mm.** Antennae, palpi, head and thorax ochraceous buff. Abdomen greyish brown, anal tuft paler. Legs shining pale grey. Fore-wings, costa moderately arched, termen oblique, rounded; ochraceous buff, faintly reticulated chestnut brown; a quadrate chestnut-brown dorsal patch at ¼, not extending to the fold, its posterior margin angulated outwards and narrowly buff, the apex emitting a chestnut-brown streak which connects a small longitudinal patch lying between this patch and the costa; central fascia moderately broad, oblique and dilated outwardly to the tornus, chestnut brown, narrowly margined buff; a triangular apical patch of chestnut brown is indistinctly connected by a fine chestnut-brown streak to tornus; cilia pale ochraceous. Hind-wings ♂ greyish fuscous; ♀ brownish fuscous; cilia pale shining greyish ochreous, a darker sub-basal line.

Holotype, ♂, Issiki coll. *Allotype*, ♀, Issiki coll. *Paratypes*, Brit. Mus.

Hab. Formosa, 1 ♂, 4 ♀♀, Taihoku, 18.x–6.xi.1923 (*Issiki*); 1 ♀, Sinten near Taihoku, 11.ix.1925 (*Issiki*). Six specimens.

Male and female genitalia are shown in text-fig. 1, and are figured from the types in Issiki coll.

Ergasia, gen. nov.

Type *E. indignana*, Christ.

Antennae simple, ½. Labial palpi moderate, porrect; second segment roughly clothed above and beneath; terminal segment very short, smooth. Head and thorax smooth.

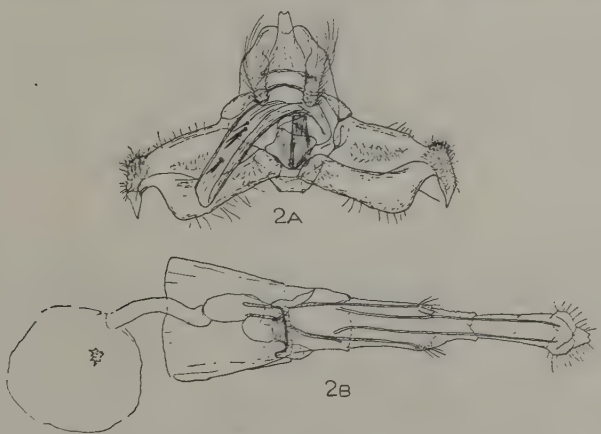


Fig. 2.—*Ergasia indignana*, Christ., *a*, male; *b*, female.

Fore-wings with raised scales; ♂ without costal fold; 12 veins, all separate, 2 from ⅝, 3 from angle bent downward, 3, 4, 5 approximate at base, 6 widely separate from 5; 6, 7, 8 approximate at base, 8, 9, 10 equidistant, 11 widely separate, from before middle of cell. Hind-wings without cubital pecten; 8 veins all separate, 2 from ⅔, 3 from angle, 3, 4, 5, approximate at base, 6 and 7 approximating towards base.

Male genitalia with harpe short and broad; uccullus produced, a prominent pointed process from anal angle; sacculus broad and thickly chitinised; transtilla well developed in the form of a belt; tegumen without uncus; socii developed, finger-like, hairy; gnathos forming a subanal plate, produced and narrowed towards the end; juxta weakly chitinised,

connected with aedeagus by a heavily chitinised oblong flattened arm; aedeagus extremely long and broad. Female genitalia with apical and subapical segments extraordinarily elongate, retractile; pad not well developed; bursa with signa a scobinate patch; ductus short.

The speciality of this genus is the long retractile terminal abdominal segments of the ♀ which is unique in the TORTRICIDAE; in the ♂ genitalia there appears to be a resemblance to the genus *Peronea*, and while the erection of a new genus could hardly be sustained on the wing-venation, which is closely allied to that of *Argyrotoxa*, it is at once apparent by the genitalia that the following two species should be placed under a separate genus.

Tortrix indignana, Christ., 1881, Bull. Soc. Imp. Nat. Mosc., **56**: 69; Kennel, 1910, Pal. Tort., Zoologica, Stuttgart, **54:** 168, t.-f. 8·52; Meyr., 1912, Lep. Cat., **10:** 39; Meyr., 1913, Wytsman Gen. Ins., **149:** 39; Issiki, 1922, Dobuts. zasshi, **34:** 284.

Hab. E. SIBERIA; JAPAN, Hokkaido. Type Bang-Haas coll.

The male and female genitalia are shown in text-fig. 2, figured from specimens in Issiki coll.

Tortrix tigricolor, Wlsm., 1900, Ann. Mag. Nat. Hist., (7), **5**: 452; Mats.,

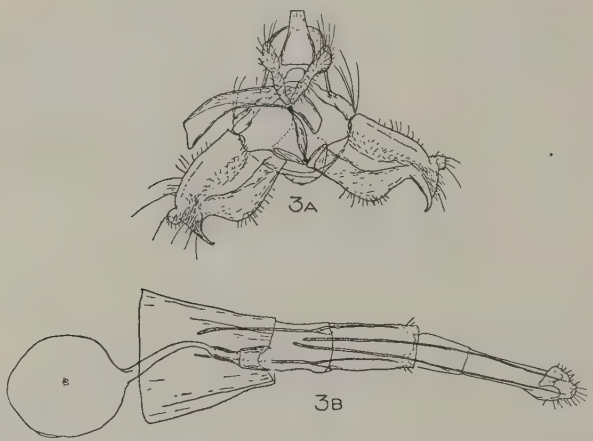


FIG. 3.—*Ergasia tigricolor*, Wlsm., *a*, male; *b*, female.

1906, Cat. Ins. Jap. sppl. 1, p. 9, no. 1883; (*tricolor*); Meyr., 1912, Lep. Cat., **10**: 52; Meyr., 1913, Wytsman Gen. Ins., **149**: 51.

Hab. JAPAN: Hokkaido and Honsyu Is. Type Brit. Mus.

The male and female genitalia are shown in text-fig. 3, and are figured from the type specimens in Brit. Mus.

A NEW SPECIES OF *NYCTERIMORPHA* (DIPTERA, NEMESTRINIDAE)

By F. W. Edwards, M.A., Sc.D., F.E.S.

(*British Museum, Natural History.*)

The genus *Nycterimorpha*, described by Lichtwardt in 1909 * from a single specimen from Queensland, is perhaps the most remarkable of the family Nemestrinidae. It was considered by its describer, no doubt correctly, as being closely related to *Nycterimyia*, the two genera agreeing in the presence of a large ocellar tubercle, in the form of the face and in the type of wing-markings—hyaline " windows " on a brown ground. *Nycterimorpha*, however, differs strikingly from *Nycterimyia* as well as from all other Nemestrinidae in the shape of the wings, which are narrowed at the base, without any trace of alula or of anal angle, also in the slender, curved abdomen and in the remarkably clubbed hind tibiae; the venation is also somewhat different from the usual Nemestrinid type, although the veins can be fairly easily homologised with those of *Nycterimyia*.

All the species of *Nycterimyia* as well as the single species of *Nycterimorpha* hitherto known are very rare in collections; of *N. speiseri*, in fact, only one additional specimen has been placed on record since the type was described by Lichtwardt. The British Museum is fortunate in possessing a specimen of *N. speiseri* and also a single specimen of a second, closely allied species, which is described below as *N. pyralina*.

Features of interest common to the two species, but not heretofore noted, are: (1) the slender third antennal segment is hairy above for almost its entire length; (2) the swollen central portion of the face is hairy, only the sides and upper portion being almost or quite bare, not the whole face as suggested by Lichtwardt; (3) the thorax is much less hairy than in related genera, the sternopleura being bare or nearly so.

Nycterimorpha speiseri, Licht.

Lichtwardt's type was a male from Cairns, N. Queensland; a second male was recorded by Hardy † from Mt. Tambourine; Hardy gave diagrammatic figures of the wing and antenna, which were copied and discussed by Mackerras ‡ in his revision of the Australian Nemestrinidae. The British Museum possesses a male from the Brunetti collection labelled " Queensland "; no exact data have been noted, but it was quite probably collected by F. P. Dodd in the neighbourhood of Cairns. The wing of this specimen is shown in text-fig. 2, *b*; it differs slightly in details of venation and markings from the wings figured by Lichtwardt and Hardy, but all the specimens doubtless belong to the same species; both venation and markings are evidently subject to individual variation. The wing of Brunetti's specimen is about 7 mm. in length (Lichtwardt gave a measurement of 8 mm. for the wing of his type); the ground-colour is mainly bright orange-brown, with a narrow darker shade bordering the clear spaces; the spot in the upper basal cell is broadly in contact with the radius; the one in the anal cell is long and narrow; and the one in the " middle discal " cell is large and quite near the base.

* 1909, *Deuts. ent. Z.*, **1909**: 648.
† 1925, *Proc. Linn. Soc. N.S.W.*, **49**: 459.
‡ 1926, *Proc. Linn. Soc. N.S.W.*, **50**: 556.

Nycterimorpha pyralina, sp. n.

Closely resembles *N. speiseri* in all structural details; there is a slight difference in the shape of the third antennal segment (*N. speiseri* being shown in text-fig. 1, *a*, *N. pyralina* in text-fig. 1, *b*), but this is probably not constant; the upper discal cell of the wing appears to be distinctly longer than that of *N. speiseri*, and the anal cell somewhat less narrow.

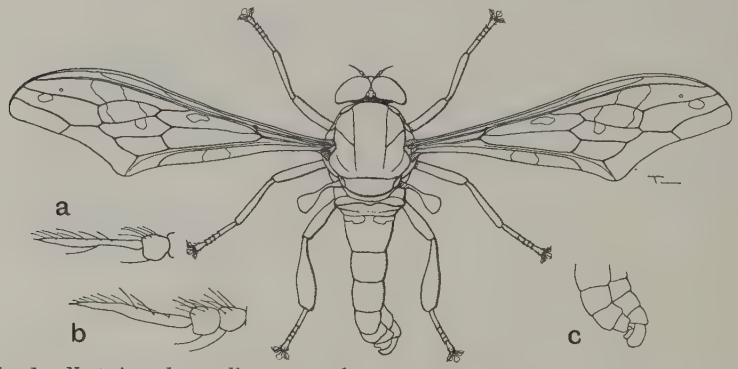


Fig. 1.—*Nycterimorpha pyralina*, sp. n. ♂. *a*, antenna of *N. speiseri*, Lichtw.; *b*, antenna of *N. pyralina*, sp. n.; *c*, tip of abdomen of *N. pyralina*, sp. n., side view.

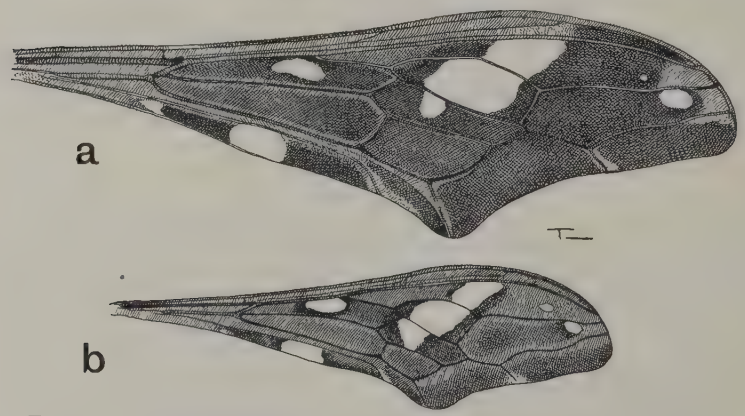


Fig. 2.—*a*, *Nycterimorpha pyralina*, sp. n., wing; *b*, *N. speiseri*, Lichtw., wing.

Colour and pubescence also very much as in *N. speiseri*, but ground-colour of wings much darker, the orange-brown tint being almost confined to the costal area and a small patch at the tip; spot in upper basal cell only just in contact with radius; spot in anal cell shorter and broader; spot in middle discal cell smaller and further from base. Size considerably larger than *N. speiseri*, the wing measuring 11 mm. in length.

Malay Peninsula: Fraser's Hill, Pahang, 4000 ft., 27.i.1929 (*H. M. Pendlebury*). Type ♂ presented to the British Museum.

The specimen was captured on the wing and was said by Mr. Pendlebury to bear a close resemblance to a small Pyralid moth; hence the specific name.

FOUR NEW *APANTELES* (HYM., BRAC.)

By D. S. Wilkinson, F.E.S.

(*Imperial Institute of Entomology.*)

Apanteles galleriae, sp. n.

♀♂. Black; the front femora (except basally), the front tibiae with their spurs, and the front tarsi, the middle femora apically, the middle tibiae and tarsi, and about the apical three-fifths of the hind tibiae, red testaceous *; the palpi and the posterior tibial spurs pale; wings hyaline; the stigma and metacarp uniformly dark brown; the remaining veins pigmented in various degrees, but not so strongly as in the stigma, except possibly portions of the costal veins.

♀♂. *Head:* face and clypeus with minute (degree 1), regular punctation; the clypeus not (or hardly) differentiated; facial depressions nearer to apex of clypeus than to the eyes; vertex punctate much as on the face; occiput minutely rugose; the posterior ocelli possibly rather nearer to each other than to the eyes. *Thorax:* mesonotum rather dull, punctate (degree 3), the punctures close but distinctly separated, more strongly and more closely punctate along the lines of the notauli, where, anteriorly, the punctures are almost reticulately rugose; posteriorly the lines of the notauli are much broadened and finely

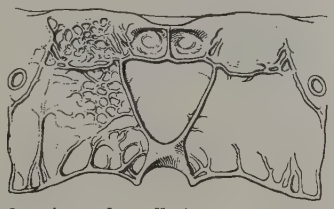


Fig. 1.—*Apanteles galleriae*, sp. n., propodeon.

striato-rugose, so that there is a large striato-rugose area in the posterior third of the mesonotum, on each side of a separately punctate median one-seventh, that occupies quite one-fourth of the breadth of the mesonotum; disc of scutellum highly shining, with a fair amount of minute (degree 1) and widely separated punctation in the basal third and to some extent laterally, otherwise entirely smooth; propodeon (fig. 1) basally to the costulae more or less dull, rugose, and setiferous, beyond the costulae decidedly shining and virtually without rugae, the areola smooth and highly shining; the costulae weak, occasionally almost obsolete; the areola marked with strong carinae, its sides beyond the costulae straight, V-shaped; the areola closed basally by a weak carina, and with some weak carinae leading from its base to the base of the propodeon. *Wings:* the 1st abscissa of the radial rather shorter than or about equal to the breadth of the stigma, slightly curved (concavity basad), its junction with the straight or very slightly curved (concavity apicad) transverse cubital, than which it is 1·6 times longer, marked by a distinct angulation on the outer side (the remains of the 2nd abscissa of the radial); the transverse cubital, the apical portion of the 1st abscissa of the cubital, and the pigmented portion of the 2nd abscissa of the cubital, all about equal, and rather shorter than the recurrent; the upper portion of the basal vein long, sometimes almost four-fifths, but normally about three-fifths, the transverse cubital; metacarp much longer than stigma. *Legs:* hind coxae on outer faces highly shining, with only minute (degree 1) punctation, and with some large areas entirely smooth, basally above the punctures rather stronger (degree 2) and closer; the

* In one or two small specimens the front femora, and even the front trochanters, are entirely red testaceous; and only about the apical fourth of the hind tibiae is darkened, with the hind tarsi hardly at all.

longer hind tibial spur somewhat longer than half, and the shorter spur two-fifths, the length of the basal joint of the hind tarsus (16 : 12 : 30). *Abdomen* (fig. 2): 1st tergite with median length 1·8 times basal breadth and about three times apical breadth (36 : 20 : 13), parallel-sided in the basal five-ninths, thereafter regularly contracting to the slightly emarginate apex whose lateral angles are not rounded, the tergite with a strong median tumescence whose basal slope is smooth (as is the basal half of the tergite) but whose apical slope (as the majority of the apical half of the tergite) is weakly rugoso- or striato-punctate *; the apical four-ninths of the tergite strongly turned over and down and medianly slightly excavate, while the median third of the extreme apical margin is raised, smooth, and highly polished; in each apical angle and occupying the lateral thirds of the apical margin is a large punctiform depression †; 2nd tergite smooth save for one row of minute punctures (degree 1) across the apex, with smooth, well-marked, straight, lateral sulci, and with its apical breadth three times its median length and about 2·3 to 2·4 times its basal breadth, which is equal to the apical breadth of the 1st tergite; 2nd suture bisinuate; 3rd tergite

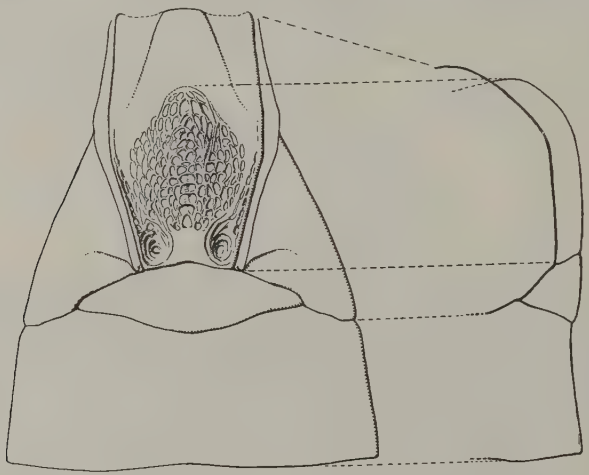


Fig. 2.—*Apanteles galleriae*, sp. n.: 1st, 2nd, and 3rd tergites.

with median length about twice that of the 2nd (16 : 8–9), shining and with only minute, scattered punctation as on the succeeding tergites; ovipositor sheaths as long as the hind tarsus.

Length, 2–3 mm.

France: Montpellier, 2 ♀♀ (one the *type*), 1931, 2 ♀♀, 4 ♂♂, 1930 (*J. Suire*). *Type* deposited in the British Museum.

Host. Recorded to have been bred from larvae of the wax-moth, the Pyralid *Galleria mellonella*, L. *Cocoons* unknown.

This new species is extremely close to *tirathabae*, Wilkn., to which it would run in my revised key were it not for the disc of its scutellum which is quite distinctly minutely punctate: but it may be separated from *tirathabae*, however, on other, though rather more critical, characters, namely the shape of the 2nd tergite and the nature of the mesonotal sculpture. From the remaining closely related species, namely *bambusae*, Wilkn., *parasae*, Rohw., and *hasorae*,

* This sculpture in the smaller specimens is notably very much weaker.

† This character is exhibited also in *A. tirathabae*, Wilkn., but was unfortunately omitted from the original description of that species.

Wilkn., it is immediately separable by means of the areola, which in these latter is not describable as V-shaped beyond the costulae and closed basally by a weak carina.

In 1912 Conte (*C. R. Acad. Sci. Paris*, **154**: 41) recorded that he had observed, in the neighbourhood of Lyons, *Apanteles lateralis*, Hal., to be an abundant parasite of *Galleria*. From the description that he gave of the adult parasite, however, it is quite clear that the *Apanteles* he had before him was neither *A. lateralis* nor the species I have described above as new, unless it is that his description is at fault. Paddock, in 1913 and 1914, referred to Conte's record. In 1926 Suire (*Feuille jeun. Nat.*, **47**: 129) recorded another species of *Apanteles* to be a parasite of *Galleria*, namely *A. hoplites*, Ratz., and I have before me a specimen on which he based his remarks; this was sent to me just lately by M. Suire himself. This *Apanteles*, which is quite distinct from *galleriae*, and which does not agree with Conte's description of the *Apanteles* that he bred, runs in Marshall's key to and agrees with Marshall's description of *hoplites*, Ratz. Ratzeburg's species is not known to me, however, and is not represented in the British Museum. Finally, later in 1926, Picard (*Feuille jeun. Nat.*, **47**: 185), having seen Suire's paper, published some notes in the same journal drawing attention to the records of *lateralis* and *hoplites* and questioning whether it was likely that there were in reality two species of *Apanteles* capable of parasitising the larvae of *G. mellonella*.

Apanteles vernaliter, sp. n.

♀. Black; scape, tegulae, the four anterior legs (except the major portion of their coxae), the hind legs (except the coxae), and almost the entire venter, together with the lateral membranous portions of the 1st and 2nd tergites, red testaceous; palpi and tibial spurs pale; mouth-parts and ovipositor red; the 3rd and succeeding tergites often much reddened; flagellum red-brown; wings hyaline; the costal veins red testaceous, the stigma and remaining veins light brown to almost colourless; stigma with a distinct cloud occupying the basal fourth.

♀. *Head:* face with shallow and rather irregular punctation (degree 2–3), the clypeus more or less differentiated; the facial depressions rather nearer to apex of clypeus than to the eyes; frontal orbits, vertex, and occiput, with closely placed, shallow punctation (degree 3–4); the posterior ocelli nearer to each other than to the eyes. *Thorax:* mesonotum with rather closely placed, strong punctation (degree 4), smooth along the posterior margin immediately anteriorly to the scutellar sulcus; disc of scutellum smooth and with only an occasional minute puncture, flattened and on the same plane as the posterior half of the mesonotum, the straight scutellar sulcus with its crenulations raised virtually to the same level; propodeon in the greater part entirely smooth and shining; the carinae of the areola and costulae strong; the carinae delimitating basally the areola run obliquely across the propodeon and form with the costulae almost a straight line, the areola, however, not quite closed basally since these carinae do not quite join medianly but turn upwards sharply and almost reach the base of the propodeon; apically the areola broadly rounded, these carinae joining with the oblique basal carinae at an acute angle. *Wings:* the 1st abscissa of the radial and the transverse cubital evenly rounded with their point of junction indeterminable; stigma broad, its greatest breadth 1·3 times the length of the recurrent, and half its own length, which is considerably less than that of the metacarp; upper portion of basal vein short, shorter than the pigmented portion of the 2nd abscissa of the cubital. *Legs:* hind coxae with only minute (degree 1) and sparsely placed punctation, save possibly for some rather stronger punctation basally above; the hind tibial spurs short, nearly subequal, the longer spur half the length of the basal joint of the hind tarsus. *Abdomen:* 1st tergite with sides more or less straight and slightly diverging, the apical angles not rounded, and the apex truncate to somewhat emarginate, its median length rather longer than apical

breadth, with the integument rugoso-reticulate, medianly somewhat tumescent, with at least its apical half turned over and down and slightly hollowed medianly (where it is also slightly less strongly sculptured), and with a conspicuous, smooth lunule on middle of apical margin; 2nd tergite sculptured almost as strongly as the 1st, strongly transverse (5 : 21), rounded apically and thus (and also on account of the emargination of the apex of the 1st tergite) with its median length distinctly longer than its lateral margins, which are short, straight, and slightly diverging; 3rd tergite entirely smooth (save for the usual transverse row of exceedingly minute punctures), with median length almost twice that of the 2nd tergite (19 : 10); hypopygium membranously acute; ovipositor sheaths as long as the hind tarsus.

Length, 2·0–2·25 mm.

Java : Buitenzorg, 5 ♀♀, viii. 1929 (*R. W. Paine*).

Type deposited in the British Museum.

Host. The series is labelled—"bred from larvae of coconut-flower Tineid (yellow species)." *Cocoons* white, apparently solitary.

This new species runs in my revised key to *trochanteratus*, Szép., from which I have separated it as follows :—

Propodeon almost entirely strongly rugoso-reticulate; scutellar sulcus curved (Tanganyika) . . . . . *trochanteratus*, Szép.

Propodeon in the greater part entirely smooth and shining; scutellar sulcus straight (Java) . . . . . *vernaliter*, sp. n.

According to my key, other related species are *piceoventris*, Mucs., *carpatus*, Say, and *fuscicornis*, Cam., but these are immediately separable on account of the sculpture of their hind coxae.

Apanteles schoenobii, sp. n.

♀♂. Black; mouth-parts (except as follows), all legs including coxae (except as follows), the majority of the abdominal sternites, the 3rd tergite and at least the apical half of the 2nd, red testaceous; palpi and tibial spurs pale; hind tarsi, and the extreme apex of the hind tibiae, very slightly darkened in the ♀, decidedly darkened in the ♂; all feet darkened; tegulae testaceous, as are the costal, medial, and anal veins of the fore-wing at base; wing-veins otherwise, and the stigma and metacarp, rather dark brown, the stigma uniformly opaque; the wings distinctly infumated.

♀♂. *Head :* face and clypeus evenly and closely punctate (degree 3 in ♀, 2 or 1–2 in ♂); the clypeus differentiated from the face; facial depressions large, distinctly nearer to apex of clypeus than to eyes; frons and vertex evenly and regularly punctate (degree 2 or 1–2); occiput minutely rugose; posterior ocelli nearer to each other than to the eyes, very distinctly so in the ♀. *Thorax :* mesonotum punctate throughout, strongly so (degree 4–5) along the lines of the notauli, more weakly so (degree 3) elsewhere; the scutellar sulcus broad and deep, with six strong crenulations; the disc of the scutellum with minute punctation (degree 2); the mesopleurae nowhere entirely smooth, anteriorly minutely rugose; propodeon with a deep, transversely rugose areola, which is bounded by rugose carinae, and which is U-shaped at apex; the costulae present as rugose carinae, beyond which in the ♀ the propodeon is rugoso-reticulate and basally to which it is rugoso-punctate; these differences not so clearly marked in the ♂, the propodeon both basally and apically to the costulae more rightly describable simply as rugose (this probably being due to its smaller size). *Wings :* the 1st abscissa of the radial very strongly angled with, and in length equal to, the transverse cubital, these veins together forming an angle not very much greater than a right-angle; the transverse cubital shorter than the recurrent, 1·5 times as long as the apical portion of the 1st abscissa of the cubital, this latter equal to the upper portion of the basal vein. *Legs :* hind coxae dull, closely and minutely setiferous throughout; the longer hind tibial spur two-fifths, and the shorter spur one-third, the length of the basal joint of the hind tarsus. *Abdomen :* 1st tergite with its lateral margins diverging and

more or less straight, but slightly rounded, or contracted, at extreme apex, with its apex very slightly emarginate, so that its median length in the ♀ equals the greatest breadth of the tergite (which is slightly before apex), is somewhat greater than the apical breadth, and is about 1·5 times the basal breadth (28 : 28 : 24 : 18), and in the ♂ is distinctly greater than the greatest breadth, 1·3 times as great as the apical breadth, and nearly twice the basal breadth (26 : 22 : 20 : 14); the tergite is rugoso-punctate in the ♀, and carinately rugose in the ♂, in the basal half with a strong median tumescence which is connected almost with the apex of the tergite by a well-marked, median, elongate, areola-form impression; this impression inside is not so regularly sculptured as the remainder of the tergite, and its limits are indeterminable exactly being shown only by somewhat stronger sculpturing and not by any one definite carina; medianly on the apical margin of the tergite is a smooth lunule; 2nd tergite virtually rectangular, with its median length in the ♀ about two-fifths, and the ♂ half, its breadth (14 : 34 and 14 : 28), and in both sexes only just shorter than the median length of the 3rd tergite (14 : 15), the integument throughout with longitudinal, parallel, rugulose carination; 3rd tergite dull, with minute (degree 2) punctation throughout; ovipositor sheaths about as long as the hind tibiae; hypopygium apparently membranously acute.

Length : ♀ 3 mm., ♂ 2·5 mm.

South India : Hebbal Farm, 1 ♀, 1 ♂, i. 1931 (*T. V. Subramaniam*).

Type deposited in the British Museum.

Host. These specimens are labelled "ex larva of *Schoenobius*," and with a serial number, No. 7. *Cocoons* unknown.

On account of the areola and the costulae, in conjunction with the red testaceous hind coxae and hind femora, *A. schoenobii* runs in my revised key to a small group represented as far as I know by only two or three other species ; an abstract of my revised key is given after the description of *bakeri*, sp. n., which also runs here. *Apanteles schoenobii*, however, can hardly be said to be related to the species with which it runs in my key, and subsequently will probably have to be placed in a sub-group of its own.

Apanteles bakeri, sp. n.

♀♂. Red testaceous; the flagellum and the ovipositor sheaths red-brown; wing-veins, stigma, and metacarp, brownish-red to red-brown; the wings infumated; in some specimens the flagellum is dark brown to black, and in other specimens the hind tarsi and the apex of the hind tibiae are darkened, in others strongly darkened.

♀♂. *Head* minutely punctate, the frons, ocellar region, and the occiput medianly, almost entirely smooth; the facial depressions equidistant from the apex of the clypeus and the eyes, or just nearer to the former; clypeus not, or very weakly, differentiated; the labrum large, prominent; posterior ocelli equidistant from each other and the eyes. *Thorax :* mesonotum with regular, minute punctation (degree 1); the scutellar sulcus cleanly cut, broad, deep, nearly straight, and with seven strong crenulations; the disc of the scutellum nearly flat, on the same plane as the posterior portion of the mesonotum, and with sparse, minute punctation; propodeon with the carinae of the areola and the costulae very strong, otherwise not sculptured save for an occasional minute puncture basally; the areola virtually pentagonal, its five sides quite straight (except as follows); the two basal carinae of the areola commence at the middle of the extreme base of the propodeon, and for a very short distance run parallel with and not quite touching each other, then diverging at an angle not much less than 90°; the straight, horizontal costulae emitted slightly before the middle of the propodeon; the apical lateral margins of the areola then converge to the truncate or slightly rounded apex, their length being rather less than that of the basal margins and rather more than (occasionally about equal to) the apical breadth of the areola, whose greatest breadth (*i.e.*, at the emission of the costulae) is greater than the length of the basal margins but less than its median length. *Wings :* the 1st abscissa of the radial

rounded, and the transverse cubital straight, their point of junction distinct, the former just longer than the recurrent, which is longer than the breadth of the stigma, this latter greater than the length of the transverse cubital, which is three-fourths the 1st abscissa of the radial; the apical portion of the 1st abscissa of the cubital half the length of the 1st abscissa of the radial, longer than the pigmented portion of the 2nd abscissa of the cubital, which is distinctly longer than the upper portion of the basal vein; stigma considerably shorter than metacarp. *Legs :* hind coxae highly polished and with only sparse, minute punctation; the longer hind tibial spur three-fifths, and the shorter spur half, the length of the basal joint of the hind tarsus. *Abdomen :* 1st tergite more or less parallel-sided in the basal half to two-thirds, then slightly contracting (usually rather more strongly contracting in the ♂ apparently), with the median length twice the median breadth (20 : 10), smooth and excavate basally, medianly with a strong, smooth tumescence just beyond which in the lateral thirds is a group of indefinite punctures, the apical third of the tergite turned over and down and medianly with a broad, smooth, shallow excavation, the apex truncate to slightly emarginate; 2nd tergite with its lateral sulci very widely divergent basally, then angled, the median length of the tergite rather less than that of the 3rd, smooth save for sparse minute punctation; 3rd and succeeding tergites throughout minutely punctate, not, as is more usual, with but a single row of minute punctures; hypopygium membranously acute; ovipositor sheaths of the same length as the hind tibiae.

Length, 3 mm.

Philippine Is.: 3 ♀♀, 8 ♂♂, Mt. Makiling, Luzon; Surigao, Mindanao; Los Baños, undated (*P. I. Baker*); Manila, undated (*Robert Brown*).

Type and *Cotypes* in the U.S. National Museum; *Cotypes* in the British Museum. *Host* unknown. *Cocoons* unknown.

The material from which this species has been described was obtained from the Baker Collection, which is the property of the U.S. National Museum, and of which the Microgasterinae were very kindly lent to me for examination.

On account of its coloration this quite interesting species runs in my revised key to a small group the members of which I have separated as follows :—

A. Second tergite of ♀ barely (if at all) shorter than 3rd and virtually rectangular, with longitudinal rugulose carination throughout (S. India) *schoenobii*, sp. n.

Second tergite of ♀ shorter than 3rd, usually considerably so, and not rectangular its lateral sulci distinct and oblique . . . . . B.

B. First tergite with median length about equal to apical breadth (West Indies) *nigriceps*, Ashm.

First tergite with median length considerably greater than apical breadth, at least 1·5 times and usually twice . . . . . C.

C. Mesonotum nowhere with its punctation other than minute (Philippine Is.) *bakeri*, sp. n.

Mesonotum with strong punctation at least anteriorly . . . . . D.

D. Areola at apex very broadly rounded (U-shaped) (West Indies) *vulgaris*, Ashm.

Areola at apex acutely U-shaped, or V-shaped (West Indies) *leucopus*, Ashm.

Apanteles talidicida, Wilkinson 1931.

Trinidad : 21 ♀♀, 2 ♂♂, undated (*F. W. Urich*).

Host. Recorded to have bred from caterpillars of the Hesperiid butterfly *Calpodes ethlius*, Cram., on canna. The type series, it will be remembered, was bred from a Hesperiid on wild plantain in British Guiana.

This series differs from the type somewhat in that the nervellus is not so strongly angled.

THE INDIAN SPECIES OF *CTENACROSCELIS* (DIPTERA, TIPULIDAE)

By F. W. Edwards, M.A., Sc.D., F.E.S.
(*British Museum, Natural History.*)

The genus *Ctenacroscelis* includes the largest members of the family Tipulidae; it is chiefly Oriental in distribution, only a few species occurring in the Ethiopian and Australasian regions, and none in the new world. In all essential respects the species of *Ctenacroscelis* resemble those of typical craneflies of the genus *Tipula*, but they are well distinguished by three rather noteworthy features: (1) the femora each have a close-set comb of minute black spines at the extreme tip above; (2) the axillary area of the wing is larger than in *Tipula* and is always extended basally well beyond the arculus; and (3) the vein R_3 is always curved or bent, so that the cell R_3 is narrowed in the middle, whereas in *Tipula* the vein R_3 is more or less straight.

Ctenacroscelis is well represented in British India (including Ceylon and Burma), no fewer than seventeen species being already known to occur, including four described below as new. Some of these species are distinct and isolated; others form groups of closely-related species which also include Malayan or Chinese representatives. Among the Indian species *C. carmichaeli*, *C. dravidicus* and *C. pallifrons* are the most isolated; the remaining fourteen can be arranged in the following five groups:—

A. The *brobdignagius*-group. Size very large, the wing measuring at least 30 mm. in length. Nasus distinct. Flagellar segments scarcely enlarged beneath and with very short hairs. Thorax with praescutal stripes dark and more or less fused, but leaving margin of praescutum broadly orange-yellow; pleurae with a narrow ill-defined dark stripe from neck to below wing-base; sternopleura and coxae pale. Wings brownish, somewhat darkened towards costa and along some of the veins, but without obvious markings. Indian species: *C. fulvolateralis*, Brun., *C. majesticus*, Brun. Other described species: *C. brobdignagius*, Westw., and *C. fulvipes*, Edw. (China); *C. mikado*, Westw. (Japan); *C. clavipes*, Edw., and *C. similis*, Edw. (Formosa).

B. The *umbrinus*-group. Wing-length about 20–28 mm. Nasus long and distinct. Segments 4–12 of antenna each with about four rather long black hairs, one on each side and one or two beneath. Thorax with dark praescutal stripes which are more or less contiguous, but sides of praescutum even darker than stripes, strongly contrasting with pale upper part of pleurae; a rather conspicuous dark stripe on pleurae from neck to base of abdomen, also a conspicuous dark brown mark on lower part of sternopleura; coxae each with a brown band across middle. Wings brownish, but without distinct markings other than a small pale area before stigma and a darker brown seam over *m-cu*. Indian species: *C. ochripes*, Brun.; *C. infindens*, Walk. Other described species: *C. umbrinus*, Wied. (Java, Sumatra, Malaya); *C. conspicabilis*, Skuse (Australia); *C. fijiensis*, Alex. (Fiji).

C. The *albovittatus*-group. Similar to the last, but hairs on antennal flagellum very short (as in most other species of the genus); pleural dark stripe not extending back distinctly beyond level of base of wing; sternopleura and coxae pale. Indian species: *C. fumipennis*, Brun.; *C. nudicaudatus*, sp. n.; *C. lineaticeps*, sp. n.; *C. dives*, Brun. Other described species: *C. albovittatus*, Macq. (Tropical Africa); *C. brunneus*, Bigot (Madagascar).

D. The *serratus*-group. Size large (wing usually about 30 mm. long). Nasus long and distinct. Segments of antennal flagellum usually more or less enlarged beneath, with some short hairs laterally near base but no ventral hair. Thorax orange-brown or ochreous; no markings on pleurae; praescutal stripes if present ill-defined and greenish-tinged. Wings light or dark brown but without markings, even stigma indistinct. Indian species: *C. serricornis*, Brun.; *C. flavoides*, Brun.; *C. rector*, Edw. Other described species: *C. serratus*, v.d.W. (Java).

E. The *monochrous*-group. Species of medium or rather large size. Nasus absent. Segments of antennal flagellum not or scarcely enlarged beneath, with scattered short hairs. Thorax orange or ochreous, with or without dorsal markings but without markings on pleurae. Wings faintly greyish-tinged, stigma and veins darker grey, no other markings. Indian species: *C. flavus*, Brun.; *C. ornatithorax*, Brun.; *C. rex*, Alex. Other described species: *C. monochrous*, Wied. (? = *C. pilosulus*, v.d.W.) (Java).

1. *C. carmichaeli* (Brun.).

1913, *Tipula carmichaeli*, Brunetti, Rec. Ind. Mus., **9** : 257.

Although this magnificent species possesses all the characters of the genus *Ctenacroscelis*, it differs strikingly from all other members of the genus in the elaborate markings of the thorax, abdomen, and wings; in the clubbed form of the abdomen; and in the colouring of the legs, the tibiae being broadly black at the base as well as the tip. Brunetti's type was a male from Sureil, Darjiling district; the British Museum possesses two specimens, both females: one from N. Chin Hills, Burma, 1893? (*E. Y. Watson*) and one from Government House, Darjiling, 22.v.1917 (*Capt. D. Balfour*).

2. **C. dravidicus,** sp. n.

♀. *Head* mostly dark brown, lighter round eye-margins; rostrum at least as dark above as on sides, lighter beneath. Antennae 12-segmented, 1 and 10–12 dark brown, remainder ochreous-brown; 12 as long as 11 and almost as thick; 5–10 all rather slender, slightly rounded beneath, with very short verticils. *Thorax* mainly rather dark brownish; inner and outer margins of the four praescutal stripes darkened, scutal marks also margined with dark brown; praescutal stripes practically contiguous; a not very conspicuous ochreous area on upper part of pleurae from spiracle to wing-base, below which is a very ill-defined darker stripe. *Abdomen* brownish, with indications of a median darker stripe. *Legs* rather light brownish; femora with a more ochreous preapical ring, tips dark brown. *Wings* with conspicuous pale areas on a brownish ground, including a squarish area near outer end of cell *M*, one on hind margin near tip of *Ax*, and one before stigma, also pale areas at bases of cells M_1, M_2 and *Ax*; the usual dark brown seam over *m-cu*; dark seams also present at base of cell *M*, apex of discal cell, and tip of R_2, which is turned up at an angle with the basal portion of the vein. Halteres with brown stem and black knob.

Length of body, 23 mm.; wing, 23 mm.

Palni Hills, Kodai Kanal, Shola, 15.ix.1921, 1 ♀ (*T. B. Fletcher*).

This very distinct species apparently belongs to the same group as the genotype (*C. dohrnianus*, End., of Sumatra), differing in wing-markings and other respects. The angulate vein R_3 is an unusual feature.

3. C. pallifrons, sp. n.

♂. *Head* buff-coloured, without any trace of darkening on frons or vertex; rostrum slightly more yellowish above, very slightly darkened on sides. Antennae 12-segmented, 1–3 buff-coloured, remainder brownish; no verticils; 4–10 rounded beneath, 12 shorter and thinner than 11. Palpi blackish. *Thorax* buff-coloured, almost bare; praescutum with four separate darker greenish-buff stripes, scutum with indefinite darker areas; pronotum, postnotum and pleurae unicolorous but appearing somewhat mottled owing to irregular dusting; prosternum black. *Abdomen* discoloured; segments 1–5 and hypopygium apparently mainly ochreous, 3–5 darker basally, 6–8 blackish. Sternites 7 and 8 with short golden hair, longer on posterior margin of 8; tergite 9 produced apically into two rather acute points separated by a wide V-shaped notch, the terminal portion covered with fine golden pubescence. *Legs* brownish, femora and tibiae darkened at tips, but not conspicuously. Claws rather small and simple. Femoral ctenidium well-developed. *Wings* light brownish, darker brown at base and on costal margin, including pre-arcular and arcular area, base of cell *M*, whole of cell R_2, most of cell R_3 and base of cell R_5; conspicuous dark brown seams over *m-cu*, on *Cu* before and beyond the cross-vein, and on distal half of *Ax*; a clear area occupying middle half of cell *M* adjacent to *Cu*. Venation normal; R_3 gently curved. Axillary area not quite so extended basally as in most species of the genus. Halteres brownish.

Length of body, 21 mm.; wing, 24 mm.

Pashok, 2500 ft., Darjiling district, E. Himalayas, 26.v.–14.vi.1916, type ♂ (*F. H. Gravely*; wrongly determined by Brunetti as *Tipula princeps*, Brun.).

Although a true *Ctenacroscelis*, this is not closely related to any other species of the genus hitherto known. The uniformly pale head and simple male claws are among the most distinctive features.

4. *C. fulvolateralis* (Brun.).

1911, *Tipula fulvolateralis*, Brunetti, Rec. Ind. Mus., **6** : 249.
1912, *Ctenacroscelis sikkimensis*, Enderlein, Zool. Jahrb. Syst., **31** : 1.

British Museum material is from Darjiling district, Sikkim, Assam, Kumaon and Upper Burma. One specimen was incorrectly determined by Senior-White as *C. dives*, Brun.

5. *C. majesticus* (Brun.).

1911, *Tipula majestica*, Brunetti, Rec. Ind. Mus., **6** : 248.

The British Museum possesses specimens of both sexes from Darjiling district (including type ♂) and from Shillong, Assam. Brunetti also records the species from the Eastern Himalayas and from South India and the Malay Peninsula, but these records require confirmation; it is more probable that they refer to other species, possibly to *C. ornatithorax* or *C. rector*.

C. majesticus differs from *C. fulvolateralis* in hypopygial structure, also in its stouter build and in the presence of a distinct orange spot immediately in front of the mesonotal suture.

6. *C. ochripes* (Brun.).

1911, *Tipula ochripes*, Brunetti, Rec. Ind. Mus., **6** : 260.

Brunetti's types were from Ceylon, and the British Museum collection includes several specimens from that island. The species was also recorded from South India and from the Eastern Himalayas by Brunetti, but these records are open to question.

C. ochripes is very closely related to *C. umbrinus*, Wied., as represented in the British Museum by specimens from Sumatra and the Malay Peninsula, the only obvious distinction being in the form of the male antennae. In *C. ochripes* the flagellar segments (except the first two and the last two) are greatly enlarged beneath, so that their depth is greater than their height; the enlargement does not occupy the whole length of the antenna, but leaves a distinct apical neck which is nearly half as long as the enlarged basal part. In *C. umbrinus* the ventral enlargements of these segments are much smaller and more triangular.

7. *C. infindens* (Walk.)?

1860, *Tipula infindens*, Walker, Proc. Linn. Soc., **4** : 92.
1861, *Tipula congruens*, Walker, Proc. Linn. Soc., **5** : 231.
1913, ? *Tipula novae-guineae*, de Meijere, Nova Guinea, Zool., **9** : 312.

Brunetti gave as one locality for *C. ochripes*: Castle Rock, North Kanara (*S. W. Kemp*). Several specimens from this series are in the British Museum, and these differ from both *C. ochripes* and *C. umbrinus* in the form of the male antennae, the flagellar segments being only slightly enlarged beneath and without apical necks. Specimens of *C. infindens* from Celebes and Buru possess similar antennae, and the Castle Rock specimens are therefore provisionally referred to this species. Possibly both *C. infindens* and *C. ochripes* should be treated merely as races of *C. umbrinus*.

8. **C. nudicaudatus,** sp. n.

♂. Belongs to the *albovittatus*-group, having a conspicuous pale ochreous stripe on upper part of pleurae from prothorax to wing-base, bordered below by a broad but ill-defined dark stripe which is not obviously continued back on posterior third of pleurae; no dark markings on lower part of pleurae (especially sternopleura) such as are found in most if not all species of the *umbrinus*-group.

Head with a large dark area above occupying most of frons and vertex, as in *C. umbrinus* and related species. Antennae 12-segmented, only 6–10 distinctly rounded beneath, with short hairs; 12 thinner and shorter than 11. Brown dots present above roots of antennae, but inconspicuous. *Thorax*: praescutum with four narrowly separated dark greyish-brown stripes, bordered on their outer as well as on their inner edges with dark brown. Postnotum without obvious markings, scarcely darkened at sides, with a median dark line when seen from in front. *Abdomen* dark brown, first few tergites with distinct indications of a median blackish line. Hypopygium rather large, ninth tergite almost bare; basal part long, dark, with a few dark hairs distally, lobes reddish, longer than broad, bluntly pointed, with microscopic pile but no hairs or obvious pubescence; remainder of hypopygium brownish-ochreous; style moderately broad; no hair-tufts. *Legs* rather light brownish, tips of femora rather broadly black. *Wings* with rather strong brown tinge, darker towards costa; a slight brown seam over *m-cu*, continued across lower edge of discal cell to base of M_1; obliterative streak before stigma barely distinguishable. Vein R_3 gently curved. Halteres dark brown.

Length of body, 18–20 mm.; wing, 23–25 mm.

Palni Hills, 7000 ft., Kodai Kanal, 12–14.viii.1921, 2 ♂♂ (*T. B. Fletcher*).

These specimens were at first determined as belonging to the African *C. albovittatus*, Macq., but a more careful examination revealed obvious specific differences. In the African species the dark dots above the roots of the antennae are more conspicuous and blacker; the lobes of the ninth tergite of the male are densely pubescent throughout; vein R_2 is longer and R_3 has a rather definite double bend.

9. *C. fumipennis* (Brun.).

1911, *Tipula fumipennis*, Brunetti, Rec. Ind. Mus., **6** : 250.

This species also belongs to the *albovittatus*-group, and is superficially very similar to *C. nudicaudatus*, but can be distinguished, even with the naked eye, by the markings; the pair of yellow dots on the scutum adjoining the suture stand out against the dark background of the thorax, and the abdomen has no trace of a median dark stripe.

The male (hitherto undescribed) has some rather distinctive features in the abdomen : Eighth tergite with patches of short, pale golden hair laterally, very conspicuous from above; eighth sternite largely covered with short erect golden hair, but not emarginate at tip as in *T. fulvolateralis* and related species; ninth tergite large, but the lobes reduced in size to an unusual extent, being much broader than long; inner style large, with several short pale spines. The male antennae are slender and almost cylindrical.

In addition to the female type (from Darjiling) the British Museum possesses a male from Sureil, Darjiling district (*Annandale* and *Gravely*; wrongly determined by Brunetti as *Tipula majestica*, Brun.); a female from Mussoori (*Brunetti*), one from Kurseong (*T. B. Fletcher*), and another from Gangtok, Sikkim (*Col. F. M. Bailey*).

10. **C. lineaticeps,** sp. n.

♂. Generally similar and evidently closely allied to *C. nudicaudatus*, differing chiefly as follows :—*Head* largely pale above, vertex with a thin median dark line only. *Abdomen* with segments 1–6 mainly ochreous, dark brown on sides of tergites only; 7–8 black. Hypopygium completely ochreous, including whole of ninth tergite. *Wings* with a distinct pale area before stigma and smaller pale areas beyond stigma and at arculus.

Nilgiri Hills, 6700 ft., 8.iii.1888, 1 ♂ (*Sir G. F. Hampson*).

11. *C. dives* (Brun.).

1912, *Tipula dives*, Brunetti, Fauna Brit. Ind., Dipt. Nem. : 307.

Recorded by Brunetti from the Darjiling district; the British Museum possesses a male from Nepal closely resembling Brunetti's type, also a female from Sikkim.

C. dives is larger than the other species of the *albovittatus*-group, and is fairly well distinguished by the large, yellow hypopygium and the rather obvious dark border to the second anal vein.

12. *C. serricornis* (Brun.).

1912, *Tipula serricornis*, Brunetti, Fauna Brit. Ind., Dipt. Nem. : 309.

Recorded by Brunetti from Naini Tal, Eastern Himalayas; the British Museum possesses a male from Simla, another from Gulmarg, Kashmir, and a female from Dalhousie, Punjab. The Gulmarg specimen differs somewhat from the others but seems conspecific.

In this species the rather light brownish antennae appear conspicuously serrate as seen in side view, scarcely less so in the female than in the male; the thorax is rather conspicuously hairy, especially in the male, and the mesonotum is largely greenish-grey; the wings are light brown. *C. serricornis* is evidently closely related to and may prove to be identical with *C. serratus*, v.d.W., of Java.

13. *C. flavoides* (Brun.).

1918, *Tipula flavoides*, Brunetti, Rec. Ind. Mus., **15** : 267.

Recorded by Brunetti from the Darjiling district. The British Museum possesses specimens from Shillong, Assam (*Fletcher*); Sukna (*Barraud*); Sikkim (*Dudgeon*); Chindwin, Upper Burma (*E. Y. Watson*).

C. flavoides differs from *C. serricornis* in the black and more slender antennal flagellum, bare and almost uniformly orange-brown thorax, and much darker wings, also in having more or less evident traces of a dark median line on the abdomen. It is much less nearly related to *C. flavus*, which it resembles in body-colour.

14. *C. rector*, Edw.

1928, *Ctenacroscelis rector*, Edwards, Journ. F.M.S. Mus., **14** : 131.

Recorded from the Malay Peninsula. The British Museum possesses two Indian specimens which seem to belong here, although they are rather smaller and lighter than the types : a female from Rangoon (*Archibald*) and one from Margherita (*Fletcher*).

C. rector is larger than either of the last two species, and differs from them in having the segments of the antennal flagellum almost cylindrical, scarcely enlarged beneath. In these respects it resembles *C. majesticus*, differing in the absence of any trace of a pleural stripe.

15. *C. ornatithorax* (Brun.).

1911, *Tipula ornatithorax*, Brunetti, Rec. Ind. Mus., **6** : 258.

The type male is now in the British Museum, also one other male from Mungpoo, Darjiling district. Brunetti's record from Kumaon requires confirmation.

The outer style of the male hypopygium is unusually narrow and pointed, a feature which may possibly provide a distinction from the very closely related *C. monochrous*, Wied., of Java; another noteworthy distinction is the absence of any obvious hairs on the thorax in the present species. Wing-length, 24–27 mm.

16. *C. rex*, Alex.

1917, *Ctenacroscelis rex*, Alexander, Insec. Inscit. Mens., **5** : 21.

Recorded from Taungoo district, Burma. The description appears to indicate a close relationship with *C. ornatithorax*, but the size indicated is much larger (wing-length, 40 mm. or more).

17. *C. flavus* (Brun.).

1911, *Tipula flava*, Brunetti, Rec. Ind. Mus., **6** : 252.

Described from a single male from Sikkim. The British Museum possesses a series representing both sexes from Sikkim (*Lt.-Col. Bingham*); Khasia Hills, Assam (*E. Heyne*); S. Shan States, Upper Burma, 4000 ft. (*Lt.-Col. Bingham*). I have also examined specimens of the same or a closely allied species from the Malay Peninsula, Sumatra and Borneo.

C. flavus differs from the last two species in having the thorax completely orange, with little or no trace of dark praescutal or scutal stripes; the thoracic hairs are moderately long and the outer style of the male hypopygium broad. The abdomen varies in colour from orange (like the thorax) to dark brown.

NOTES ON *DACUS CILIATUS*, LW., AND CERTAIN RELATED SPECIES (DIPT. TRYPETIDAE)

By H. K. Munro, B.Sc., F.E.S.

This paper is a contribution towards a wider study of the African Dacinae being made by the author. It is published now to establish the synonymy of the common economic species *Dacus ciliatus*, Lw.

This species and certain others form a fairly well-defined group of Dacinae having the following characters in common : a pair of moderately large, usually oval, black spots on the face ; a narrow costal stripe, an apical spot and an anal stripe on the wing ; the humeri, a moderately broad mesopleural fascia, a single or double hypopleural spot and the scutellum yellow ; the abdominal segments fused, the third in the male being ciliate ; base of ovipositor short. The species were placed in *Dacus* by Bezzi, but as it now appears that *Dacus* (s.s.) must be restricted to those species having the *a.sa*, and which were placed in *Tridacus* by Bezzi, the subgeneric position of those without *a.sa* requires consideration. They cannot be included in *Daculus*, Hendel, as in the genotype, *Dacus* (*Daculus*) *oleae*, Gmel., the abdominal segments are free, while in most, if not all, of the African species they are fused. Nor does it seem suitable to include more than two or three species, such as *Dacus fuscatus*, Wd., and *D. brevistriga*, Walk., in *Leptoxyda*, Macq. A new sub-genus may be required, but it seems needless to decide the matter hurriedly and without study of the numerous other species concerned.

The species discussed here may be separated as under :—

1 (6). Middle femora entirely ferruginous.
2 (3). Facial spots elongate . . . . . *bistrigulatus*, Bez.
3 (2). Facial spots round or oval.
4 (5). Stigma pale, costal and anal stripes faint, apical spot rather pale, shorter and rounded . . . . . *mulgens*, sp. n.
5 (4). Stigma and stripes black, apical spot black, elongate *ostiofaciens*, sp. n.
6 (1). Middle and hind femora ferruginous only on distal half or less, basal portion yellow.
7(12). A single hypopleural spot.
8 (9). Scutellar bristles twice length of scutellum apart. . . *insistens*, Curr.
9 (8). Scutellar bristles about as far apart as length of scutellum, not more than one-third wider.
10(11). Costal stripe blackish, narrow, well-defined, with an elongate narrowed apical spot on end of third vein and reaching nearly to fourth ; tibiae mostly yellow . . . . . *ciliatus*, Lw.
11(10). Costal stripe fuscous, barely crossing third vein, and apparently not forming a distinct apical spot ; tibiae reddish yellow. *africanus*, Adams.
12 (7). A double hypopleural spot.
13(14). Tibiae mostly yellow, or slightly blackened proximally, only middle femora strongly ferruginous on distal third, others slightly so. *ciliatus*, Lw., var. *duplex*, var. n.
14(13). Hind tibiae entirely ferruginous, others mostly so.
15(16). Smaller species, 5 mm. ; stigma, the rather narrow or almost absent costal stripe and elongate apical spot on end of submarginal cell and crossing slightly over end of third vein, black ; third antennal joint one-quarter as wide as long ; tip of fourth vein distinctly straightened. *ficicola*, Bez.

16(15). Larger species, 8 mm.; stigma brown, costal stripe and more rounded apical spot on end of third vein brownish; third antennal joint one-seventh as wide as long; tip of fourth vein distinctly up-curved.
vertebratus, Bez.

In considering the series of species given in the above tables, it may be noted that the chief character separating them from other species of *Dacus* without the *a.sa* is the presence of the anal stripe on the wing. That this character is a convenient one to use is perhaps the most that can be said. It is not even strongly developed in all and in odd specimens may even appear to be absent. However, this is a point that must be further considered later.

I have not yet seen specimens that I can consider *Dacus africanus*, Adams. The type is in the University of Kansas, and I am indebted to Dr. Kathleen Doering for a drawing of the wing. The species is still *sub judice*. *Dacus frontalis*, Beck., has been omitted as it is without doubt the same as *D. vertebratus* as mentioned by Hendel; further, the variety *marginalis*, Bez., seems to be barely distinguishable from normal *vertebratus*. The apical spot is not "isolated" although the costal stripe is faint, as is shown in specimens I have determined by Bezzi as the variety, but the costal stripe does tend to be faint in this species. *Dacus triseriatus*, Curr., also seems to belong to this same group, but has not been considered here.

Dacus ciliatus, Loew.

After Bezzi had published the description of his *Dacus brevistylus* in 1908, he suggested that it might be the same as either *Dacus ciliatus* or *Dacus sigmoides*, Coq., both species apparently not rediscovered since their first description. In the tables published by him from time to time he made use of such characters as were available in published descriptions; no attempt seems to have been made to confirm or reject his suspicions by the comparison either personally, or, as is so often necessary, through others, of specimens with the types concerned. During the past two or three years I have had occasion to examine large numbers of the South African *Dacus brevistylus*, and I have paid attention to the variations occurring, particularly on account of the question of synonymy. Incidentally I have had specimens compared with types, and my thanks and appreciation are due to those whose kindness and courtesy in comparing specimens and in answering questions have enabled me to form definite conclusions. I am thus sure that both *Dacus sigmoides*, Coq., and *Dacus brevistylus*, Bez., are the same as *Dacus ciliatus*, Lw., and offer the following comments.

The references given are at least comparatively complete; some are little better than catalogue references, others are to the inclusion of names in tables, usually of importance as they enable one to form an opinion as to the author's ideas in regard to particular species. References marked with an asterisk contain original descriptions, or partial or complete re-descriptions.

Dacus ciliatus, Loew.

Types, ♂ and ♀, in Swedish National Museum, Stockholm. *Loew, 1862, Ofv. Vet. Akad. Forh., **7** : 29; Bezzi, 1908, Bol. Lab. Zool., Portici, **3** : 292, 297; 1908, Bull. Soc. ent. Ital., **39** : 147; 1924, Bull. Ent. Res., **15** : 86; 1924, Ann. S. Afr. Mus., **19** : 461; Enderlein, 1911, Zool. Jahrb., Abt. Syst. **31** : 409.

The only description of Loew's that I have been able to trace is that above:

it is quite short and in Latin. In it is a curious mistake, either made by Loew himself or a printer's error, namely the statement "... *macula marginis postici pone venam longitudinalem quintam* ..." It is this that seems to have been the main difference on which Bezzi separated his *brevistylus*. It is curious, too, that he should have quibbled at this, when he accepted *Dacus binotatus*, Lw., in the description of which a similar statement occurs. However, among the many recognised species of African DACINAE, none was found having a spot below the end of the fifth vein, but there were several having a spot below the end of the sixth vein, and it was legitimate to suppose that a mistake had been made in the original description of *ciliatus*. In order to obtain information on this point I sent specimens of what I knew as *Dacus brevistylus* to Dr. W. Horn, Director of the Deutsches Entomologisches Institut in Berlin, with a request that, if the types of *ciliatus* were not in that museum, he would be kind enough to send them on if he knew where the types were. This he did, and I eventually heard from Dr. Y. Sjöstedt, Director of the Swedish National Museum in Stockholm. Dr. Sjöstedt stated that he considered the two species to be the same, and that there was no spot below the end of the fifth vein in the type. From what he said further, it seems that the anal stripe is not as pronounced as usual, but this may be because the types are now rather faded.

Dacus sigmoides, Coq.

Type, ♀, in U.S. Nat. Mus., Cat. No. 5788.

*Coquillett, 1901, Proc. U.S. Nat. Mus., **24** (1243) : 29; Bezzi, 1908, Bull. Soc. ent. Ital., **39** : 139, 146; 1908, Bol. Lab. Zool., Portici, **3** : 291, 296; 1924, Bull. Ent. Res., **15** : 88; *Froggatt, 1909, Report on Fruit and other Pests, 98; 1911, Proc. Linn. Soc. N.S.W., **35** : 867; d'Emmerez de Charmoy & Gebert, 1921, Bull. Ent. Res., **12** : 186, as *Dacus sygmoides*.

As far as I can discover, Bezzi has not recorded that he actually saw specimens that he considered either *sigmoides* or *brevistylus* from Mauritius, whence Coquillett's type came. Bezzi distinguished the two (1) by the absence of the brown spot below the eye in *sigmoides*—this spot is of no consequence whatever, and it may be present or absent; its nature will be discussed later—(2) by the end of the fourth vein being strongly bisinuous in the same species. The degree to which a vein may be bisinuous seems to be a matter of personal opinion; in most of the specimens that I have seen the end of the fourth vein, that is, the portion between the lower cross-vein and the wing-margin, is fairly bisinuous, I would not say strongly so; but in many the outer curve tends to straighten, and, also, its appearance depends to some extent on the unevenness of the wing-membrane and on the particular angle from which it is viewed under the microscope.

Some years ago I received from the late Mr. D. d'Emmerez de Charmoy, then entomologist in Mauritius, a couple of specimens labelled *Dacus sigmoides*, Coq.; these I could not distinguish from the South African specimens. Lately, too, Mr. J. Vinson, of the Department of Agriculture there, kindly sent me a series of specimens all identical with South African material.

In addition, Dr. J. M. Aldrich was good enough to compare specimens with the single female type of *Dacus sigmoides* in the U.S. Nat. Mus., and he advised me that he considered them to belong to the same species.

Dacus brevistylus, Bez.

The types appear to be in the Bezzi collection, now in the University of Milan, Italy.

*Bezzi, 1908, Bull. Soc. ent. Ital., **39** : 149; 1908, Bol. Lab. Zool., Portici, **3** : 291, 296; 1914, *id.*, **8** : 302 ; 1926, *id.*, **18** : 278; 1914, Bull. Ent. Res., **5** : 154; 1915, *id.*, **6** : 90, 100; 1916, *id.*, **7** : 101; 1924, *id.*, **15** : 86, 89; 1923, Ann. Mus. Nat. Paris, **29** : 523; 1924, Rev. zool. Afr., **12** : 11; 1924, Ann. S. Afr. Mus., **19** : 462, pl. xii, f. 9; 1928, Ann. Transvaal Mus., **12** : 331; 1927, Curran, Bull. Amer. Mus. Nat. Hist., **57** : 85; Morstatt, 1913, Der Pflanzer, **9** : 288; Munro, 1925, Ent. Mem. Dept. Agr. S. Afr., **3** : 44; 1926, *id.*, **5** : 19; 1929, *id.*, **6** : 9 (biology); 1929, Ann. S. Afr. Mus., **29** : 3; Senior-White, 1923, Cat. Ind. Ins., **4**, Trypetidae : 2; Silvestri, 1913, Bol. Lab. Zool., Portici, **8** : 94, f. xxvii; 1914, *Bull. Div. Ent. Hawaii, **3** : 94, pl. viii, f. xxvii; Aders, 1916, Med. Pub. Health Rep. Zanzibar, **1915** : 49; King, 1918, Ent. Bull. Wellcome Trop. Res. Lab. Khartoum, **8**; Hargreaves, 1927, Rep. Dept. Agr. Uganda, **1926**.

The characters used to differentiate *brevistylus* from both *sigmoides* and *ciliatus* have already been discussed. Most of the records of the species, including all economic references, have been published under the name *brevistylus*.

Tridacus mallyi, Mro. (nec Bez.), as has already been stated in 1925, Ent. Mem. Dept. Agric. S. Afr., **3** : 42, is a mss. name given me by Bezzi and based on an anomalous specimen with one *a.sa.*

In view of the economic importance of the species further remarks on its identification may not be out of place. Specimens vary somewhat in size; the normal length is between 5 and 6 mm., not many are much larger, but smaller (presumably from under-fed larvae) specimens are fairly common. The anterior portion of the frons is usually quite prominent, but may be more or less flattened according to the state of the specimen. The mesopleural fascia is about as wide as the length of the yellow humeri, but in some larger specimens tends to become rather narrower than usual. The apical spot on the wing at times reaches just to the extreme tip of the fourth vein. The spot below the end of the sixth vein only occurs in the male (of this and of other species); it is not an infuscation of the wing-membrane but is caused by the close aggregation of the microtrichiae on that area, and may be better termed a cloud; to the unaided eye it appears fairly well-defined, but under magnification tends to loose its aspect as a " spot."

In addition there are certain other more variable characters that may be noted. In many specimens (of this and of related species) there are developed on the frons brown orbital spots, three on either side, on which are the orbital bristles and also a brown spot below the eye. These spots may be quite large, the middle and hind ones being more or less fused with the dark central spot and the bar across the vertex, or they may be quite absent. They are of little value in classification and are caused by the deposition of a somewhat granular, reddish substance on the inner surface of the integument. It is probably of a physiological nature and its amount may depend on conditions governing some phase of the individual insect's metabolism. The sub-ocular spot may also be absent. Of a similar nature is a dark, broadly reticulate, symmetrical pattern observable on the dorsum of the thorax. On the third abdominal segment of both sexes may be a pair of sub-lateral black spots in the integument; in some

they are large (about as wide as the segment), rounded or more or less quadrilateral, in others smaller, and in some twenty per cent absent. After examining some hundreds of specimens it was thought that these spots did not occur on any other segment, but while this paper was in preparation a large series of specimens was received from Graaff Reinet in the Cape. Among these were found several rather small specimens having small to large black spots on the fourth segment as well. Black markings on the thorax are usually not strongly developed, being limited to a pair of hook-like spots on the hind portion of the dorsum; a few specimens, however, show rather extensive melanism, broad submedian stripes on the dorsum and more or less extensive blackening of the lower portions of the thorax as well as the mesophragma, the black on the latter at times divided by a median, narrow, ferruginous stripe. The legs in many specimens, especially those that have been in alcohol, are often quite yellow, with only the last four tarsal joints darkened, or blackened when ferruginous markings are developed elsewhere on the legs; in larger specimens particularly the distal ends of the middle femora are ferruginous, the proximal ends of the same tibiae rather blackened ferruginous, the corresponding portions of the hind legs are less darkened and of the front legs barely so; further, even if the ferruginous colour is not much developed, the proximal ends of the middle tibiae are somewhat blackened and of the hind tibiae rather more so, but they are not wholly ferruginous as in *D. vertebratus* and *D. ficicola*. The base of the ovipositor is short and conical, but may be more or less flattened according to the state of the specimen. The distance apart of the scutellar bristles compared to the length of the scutellum is of some interest on account of *Dacus insistens*, Curr. In *D. ciliatus* the distance apart of these bristles and the length of the scutellum are about equal, varying about a tenth either way; in occasional specimens the bristles are noticeably farther apart, as much as one-third wider, in others, as much closer. In *D. insistens*, of which only the female type is known, Mr. Curran has kindly advised me the bristles are twice as far apart as the length of the scutellum.

Dacus ciliatus, Lw., var. **duplex** var. n.

This variety agrees with *Dacus ciliatus*, Lw., as described above, but has a double hypopleural spot. This occurs in about ten per cent. of the specimens of *D. ciliatus* and another ten per cent. have the spot partly double. Specimens of the variety seem more or less generally distributed among those with a single

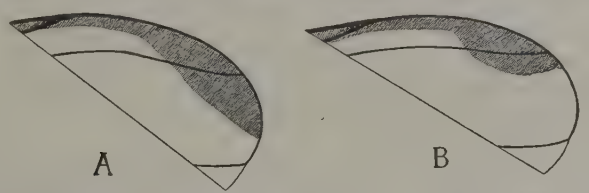


Fig. 1.—Apex of wing of, A. *Dacus ciliatus*, Lw.; B. *Dacus vertebratus*, Bez.

spot from various localities. In reared material all or only some may have the double spot. It has been considered advisable to name this variety owing to possibility of confusion with *D. vertebratus*, in which the hypopleural spot is double or at least always partly so. The latter is a much larger and more robust species than *D. ciliatus*: differences are in the appearance of the apical spot on the wing (fig. 1, A and B); the central spot on the frons is less well-

marked and the frons itself less prominent anteriorly; the second joint of the antennae is relatively longer (nearly two-thirds the length of the third, while in *ciliatus* it is only one-third); the mesopleural fascia is narrower; the distal halves of the femora and all the tibiae are ferruginous.

Type ♂ and ♀, 7 ♂♂ and 6 ♀♀ paratypes, S. Africa: Rosslyn, T.P., April–May 1931 (*D. J. Sim*) (in bait traps), as well as the following paratypes, 2 ♂♂ and 1 ♀, East London, February 1925 (*H. T. Holden*) (M. 159), recorded as *D. vertebratus* in Ent. Mem. Dept. Agric. S. Afr., **5**: 19; 1 ♂ Vrede, O.F.S. 12.iv.17 (*C. P. van der Merwe*); 1 ♀, Fraserburg Road, C.P., 3.iv.25 (*C. W. Mally*); 7 ♂♂ and 7 ♀♀, Graaff Reinet, C.P., April 1932 (*Whitlock*).

Distribution.—*Dacus ciliatus* appears widely distributed throughout Africa; actual records include Eritrea, Anglo-Egyptian Sudan, Uganda, Congo, Tanganyika, Zanzibar, Lourenço Marques, Union of South Africa (widespread), South-West Africa, Gold Coast and Guinea, as well as Madagascar and Mauritius. It has also been recorded from Southern India.

Food-plants.—As a rule only the fruits of various kinds of Cucurbitaceae, both wild and cultivated, are infested. Where the fly occurs melons, watermelons, marrows, squash, pumpkins, cucumbers, spaanspek or musk-melon, and calabash as well as chow-chow (*Sechium edule*) are attacked. Exceptional infestation of green beans and tomatoes has been recorded. It would not appear to be at all of regular occurrence, but it does indicate the potentiality of the fly of becoming an even more serious pest than it is. In the Union of South Africa about as much damage to cucurbits is done by *Dacus vertebratus* as well, either alone or with *D. ciliatus*.

Wild host-plants in South Africa are: *Cucumis myriocarpus*, *Coccinea palmata*, *Coccinea quinqueloba*, and *Momordica involucrata*. No other records of wild host-plants have been noted except that of Silvestri in *Momordica* sp. in West Africa. It must be noted that *Dacus ciliatus*, Lw., does not infest the pods of *Asclepias fruticosa*, nor of any other Asclepiad plant as far as is known. The fly that has previously been recorded as *Dacus brevistylus*, Bez., from this plant is the following new species.

Parasites.—Few parasites have been recorded. A larval parasite was reared at Durban (*C. P. van der Merwe*), namely, *Opius phaeostigma*, Wlksn. (1927, Bull. Ent. Res., **18**: 40). It does not seem to have been very numerous. Silvestri (Bull. Div. of Ent. Hawaii, **3**: 94, 101 and 112) records a heavy parasitism of pupae by two parasites, *Opius perproximus*, Silv., and *Biosteres caudatus*, Szep., in West Africa.

Dacus mulgens, sp. n.

Munro, 1925, Ent. Mem. Dept. Agr., S. Afr., **3**: 44, as *Dacus brevistylus*, Bez., from *Asclepias fruticosa*; *id.*, 1926, **5**: 20, as *Dacus brevis*, Coq., from the same plant.

A medium-sized species very like and apparently closely allied to *Dacus ciliatus*, Lw. It may be distinguished by the entirely ferruginous middle femora, the pale stigma and costal stripe and the narrower mesopleural fascia.

♂. *Length* of body, 6·6 mm.; of wing, 5·3 mm. *Head*, proportions of length, height and width 9, 10 and 13. *Occiput* ferruginous, yellow along orbits and a disconnected yellow bar behind vertex; *frons* about one-third longer than wide, widened anteriorly, brownish pollinose, with slight inconspicuous black pubescence anteriorly, browner and longer behind; brown sub-integumental markings are: a bar across vertex and round triangular black ocellar dot, three larger, irregular orbital spots on each side, also large sub-ocular spot;

frons not quite flat, but a broad, flat, tubercle not as developed as in *D. ciliatus*; bristles black, inner and outer *vt* strong, one *s.or* and two *i.or* thin and short, *oc* minute, whitish. Frons and face projecting before eyes which are rather small. *Lunule* yellow, arcuate. *Antennae* about one-third longer than face, second joint about two-thirds length of third (the total length of these two joints is about the same as in *D. ciliatus*, but the proportions are different), russet, third joint slightly blackened above and at tip; arista black with yellow base, bare; cheeks half, and genae nearly twice, width of third antennal joint. *Face* broadly keeled, yellow, with large, oval, black spots, half length of face, on sides of keel and a broad reddish or orange stripe along top of keel. *Palpi* broad, pale ferruginous, paler to base; proboscis short. *Thorax* punctate, ferruginous, a narrow, median, black stripe in front, and large black, rather inconspicuous, spots on hind half, together with a dark sub-integumentary, symmetrical pattern on dorsum; mesosternites, a spot above hind coxae, a spot below yellow hypopleural spot and mesophragma, black; humeri, a moderately broad (but narrower than in *D. ciliatus*) mesopleural fascia touching top of mesosternites and extending along suture to dorso-central line, and a single hypopleural spot, yellow; there is slight white pollen, more apparent on black areas; pubescence pale, shining brownish; bristles black, outer and inner cervicals (the latter small, hair-like), hind *npl*, *mpl* (sometimes brown) and two *p.sa* present. *Scutellum* yellow with narrow ferruginous base, width apart of bristles to length of scutellum, 5 to 4. *Wing* hyaline, stigma pale yellow, costal and anal stripes faint, rounded spot on end of third vein pale, a blackish microtrichial cloud below end of sixth vein, length of point of anal cell to rest of sixth vein, 3 to 2. *Halteres* yellow. *Legs* ferruginous, paler towards extremities, only proximal third of front femora paler, and proximal half of hind femora yellow. *Abdomen* ferruginous; oval, capsular, segments fused, third ciliate and with a pair of black sub-lateral spots; *venter* and *genitalia* ferruginous.

♀. Similar to male. *Length* of body, 6·6 mm. (excluding base of ovipositor); of wing, 5·6 mm. Cloud below end of sixth vein and ciliae on third segment absent; length of point of anal cell to rest of sixth vein, about 3 to 1·5. Base of ovipositor ferruginous, short conical, projecting but slightly beyond end of pre-abdomen, its total length 1·8 mm.

Notes.—The types are of normal size, some specimens are smaller, one only 4·6 mm. in length. The orbital and sub-ocular spots are often small, or even absent, especially in the Wilderness material. The reddish stripe on the face tends to be irregularly developed, and may be so faint as to appear absent. The mesopleura tend to be blackened before the yellow fascia. On the Wilderness specimens the black spots on the lower parts of the thorax tend to be better defined, and the mesophragma, although not so black, is divided by a narrow, median, ferruginous stripe. In teneral specimens the legs may be quite yellow, but then the proximal half of the hind femora is practically transparent. In some Wilderness specimens black sub-lateral spots are present on the third and fourth abdominal segments, and in a few from Middelburg and Pretoria, on the fifth as well. In some otherwise fully-coloured specimens from Wilderness, the anal stripe tends to be fainter than usual. A few anomalous specimens have extra bristles; three or four *i.or* and in some double outer cervicals on one or both sides.

Type, ♂ and ♀, Middelburg, Cape, 25.1.30. (*H. K. Munro*), and 64 paratypes detailed below.

Biology.—In my published notes in the Ent. Mem. Dept. Agr. S. Afr. some confusion has arisen between this species and both *Dacus ciliatus*, Lw. (as *Dacus brevistylus*, Bez.), and *Dacus brevis*, Coq. The reason, a common one unfortunately with reared material, is that the specimens were killed while still more or less teneral.

The records for *Dacus mulgens* are :—

S. Africa : Uniondale, Cape, May 1905 (*C. P. Lounsbury*). 11 specimens (Ac. C. 1770). These are those, some of which were seen by Bezzi, recorded under *Dacus brevistylus*, in Ent. Mem. Dept. Agr. S. Afr., **3 :** 44. They are all very teneral and almost colourless, but are, without doubt, the present species.

Middelburg, Cape. Feb. 1925 (*H. K. Munro*). 10 specimens (M. 168) from larvae in pods of *Asclepias fruticosa*. As stated (Ent. Mem. Dept. Agr. S. Afr., **5 :** 20) Bezzi considered these to be *Dacus brevis*, Coq., but that they seemed anomalous. The specimens are somewhat under-coloured, and became rather discoloured after pinning.

Middelburg, Cape (15 miles north) 25.1.30 (*H. K. Munro*). 8 fully-coloured specimens (M. 295) from same host-plant.

Pretoria, 1928–1930 (*H. K. Munro*). 13 specimens (M. 273 and M. 369) from same host-plant. The species is common in this locality; there are two generations in the year, about November–December and about February–March, corresponding to the two fruiting periods of the plant, *Asclepias fruticosa*.

Wilderness, Cape, Aug. 1931 (*H. K. Munro*). 24 specimens (M. 339) from larvae in pods of *Cynanchum obtusifolium* (Asclepiadaceae).

Dacus ostiofaciens, sp. n.

Very like the preceding species, but with a wing-pattern more like that of *Dacus ciliatus*, Lw., from which it may also be separated by the entirely ferruginous middle femora.

♂♀. *Length* of body, 7·0 mm.; of wing, 5·5 mm. (A large female is 7·6 mm. in length.) Differences from the description of *Dacus mulgens* are :—*Frons* flat, the orbital spots small; *lunule* ferruginous; *antennae* with black tip; *face* rather flatter; no black spots on lower portions of thorax, except a small black spot on cephalic side of yellow hypopleural spot, and in a couple of specimens the mesopleura are blackish before the yellow fascia; dorsum more uniformly ferruginous; width apart of scutellar bristles to length of scutellum, 11 to 9; on the *legs* the undersides of the ferruginous parts of the femora, especially the front femora, are often black; the metatarsi are whitish; on the *wing* the costal and anal stripes and the apical spot are black, the last elongate, narrow, extending from tip of second vein to a short distance over end of third; while the third segment in the male is ciliate, the black sub-lateral spots only occur on this segment in the material available. The large female, besides having a stronger blackish tinge, is also redder than the others; the spots on the third segment are barely apparent.

Type, ♂ and ♀, and three female paratypes, Pretoria, Feb. 1932 (*H. K. Munro*).

Biology.—The white puparia were found in the elongate pods of the small Asclepiad plant, *Rhaphionacme galpinii*. There were two or three puparia in each pod, and the larvae had prepared an exit by scraping away the wall of the pod, leaving only the thin outer skin intact.

BEES OF THE GENUS *NOMIA* FROM AFRICA

By T. D. A. Cockerell, F.E.S.

(*University of Colorado.*)

The following bees were received from Sir Guy Marshall, Imperial Institute of Entomology, and will be placed in the British Museum.

Nomia candida coloratipes, subsp. n.

♂. Extremely similar to *N. granulata*, Vachal (which is before me from Stanleyville, Belgian Congo, April 1915, *Lang* and *Chapin*), but more robust with considerably broader abdomen, and the two little tubercles on margin of third sternite are smaller and closer together. Length about 7 mm.; face with dull white hair; clypeus shining, strongly punctured, with a median tomentose depression; antennae long, third joint red beneath, flagellum dark brown beneath; a polished space at each side of ocelli; thorax above with dense moss-like pale fulvous hair, which extends to tubercles, but pleura with white hair; base of metathorax with very fine close rugae; tegulae fulvous with hyaline margins; wings hyaline, greyish apically; stigma bright ferruginous; basal nervure meeting nervulus, and first recurrent meeting second intercubitus; legs simple (middle and hind femora fairly stout), black, with the tarsi bright red, and tibiae red at apex; abdomen densely punctured (first tergite extremely densely); first tergite with a white hair band, failing in middle; tergites 2 to 5 with broad white tegumentary bands, the first suffused with yellow; long hairs overlapping these bands white. Scutellum not at all tuberculate.

Cape Province: Lady Grey, Feb. 12, 1925 (*R. I. Nel.*). Structurally, this appears not to differ from *N. braunsiana*, Friese, from Kigonsera, but the abdominal bands and the tarsi are quite differently coloured. Brauns states (1912) that Friese was wrong in supposing *N. braunsiana* to extend into temperate S. Africa; that the S. African species is *N. pulchella*, Friese. However, his account of *N. pulchella* does not fit the present insect. It seems most probable that a series of related forms will have to be grouped as races of one species, for which the oldest name is *N. candida*, Smith. Typical *N. candida* has the abdominal bands yellowish-white, none on first tergite, and comes from Sierra Leone.

Nomia amoenula, Gerstaecker.

Uganda: Kampala, July 23, 1915, 2 ♂♂ (*C. C. Gowdey*). I set these aside, as being rather large with the tegulae black in middle, but they cannot well be separated from *N. amoenula*. One has the scutellar spines all black, the other has them red. Both have the first tergite red at sides and base.

Nomia magrettii, Gribodo.

Port Sudan, on flowering creeper, 6.10.14, ♂ (*H. H. King*). This seems certainly to be Gribodo's species. Characteristic features are the great yellow lobe of hind tibiae emarginate in front, all the tarsi black at end, and the clear red antennae. The posterior face of metathorax is red and strongly punctured. *N. savignyi*, Kohl, is very closely allied.

Nomia crudelis, Westwood.

Sierra Leone: Nyala, Aug. 25, 1930, on oil palm inflorescence, 2 ♀♀ (*E. Hargreaves*).

Nomia fulvipes, Friese.

Transvaal: Pretoria, Dec. 10, 1915, and Jan. 2, 1916, in both cases visiting sunflowers.

Nomia savignyi, Kohl.

Sudan: Hag Zammar, April 17, 1915, ♂ (*H. H. and D. King*). This is not quite typical; the scutellar spines are shorter, and the large lobe of hind tibia is rich orange instead of pale yellow. The species comes over from Asia, and further material may indicate the existence of a distinct Sudanese race.

Nomia coelura, sp. n.

♂. Length about 11 mm., anterior wing 8; black, robust, mandibles entirely black; head broad, orbits strongly converging below; face densely covered with long pure white hair; tongue long and slender; antennae long, third joint with a red spot beneath, flagellum very obscurely brownish beneath; mesothorax entirely dull, even posteriorly, the punctures hardly visible under a lens; scutellum the same, not modified; channel at base of metathorax rather broad, with strong dense oblique rugae, but the lower part of the metathoracic area, without rugae, sharply separated; thorax above, and vertex, with long very pale yellowish hair; pleura with very long pure white hair; tegulae not enlarged, shining dark brown, broadly pallid in front, and narrowly at sides; wings dilute reddish-brown, the colour uniform; stigma rather small ferruginous, nervures fuscous; basal nervure gently arched, meeting nervulus; second cubital cell broader above than below; first recurrent nervure meeting second intercubitus; legs mainly black, with much pale hair; all the tarsi bright red at end; middle and hind tarsi entirely red; hind femora enormously thickened and humped, with a triangular outline, entirely black; hind tibiae very short and stout, but little produced at apex, very bright reddish-orange, black at extreme base; abdomen stout, glistening, with rather abundant pale hair; first tergite dull and excessively densely and minutely punctured; tergites 2 to 5, and sides of first, with the apical depressions dull whitish, overlapped by long hairs, the band on fifth opaque white in middle; apex with two broad rounded dark lobes; venter deeply concave, shining, third sternite with a pair of widely separated transverse tubercles; fourth sternite with a rounded protuberance at each side; fifth appearing emarginate in middle, and with a rounded shining lobe at each side, all this modified region without hair.

Cape Province: Lady Grey, Dec. 18, 1924 (*R. I. Nel.*). In Strand's table this runs to *N. magniventris*, Friese, agreeing in the long white hair on front basitarsi. The abdomen above is almost exactly as in *N. magniventris*, but the ventral structures are quite different. It also differs from *N. magniventris* by the dark tegulae and red hind tibiae and tarsi.

The two following species (*N. tricoloripes* and *N. snelli*), of which I have only males, caused me some perplexity, but they certainly appear to be undescribed. *N. tricoloripes pallidicincta*, with hind tibiae and tarsi wholly yellow, runs precisely to *N. kigonserana*, Strand, in Strand's table. But that insect, on account of the hind femora and antennae, must be different. The only other species in Strand's table resembling those under consideration is *N. kondeana*, Strand, which has antennae like *N. tricoloripes*, but femora like *N. snelli*. Another relative is *N. rubripes*, Friese, which however has red hind femora. The brief account of *N. jansei*, Cam., given by Meade-Waldo (the only publication of the species) nearly applies to our insects, but the combination of grey bands on abdomen and yellow and black legs throws it out. *N. armatula*, D. T., has similar hind femora, but the flagellum is fulvous beneath, not darkened at end, and there are differences in the legs. The

antennae of *N. tricoloripes* resemble those of *N. arnoldi*, Friese, and *M. meadewaldoi*, Brauns, but in other respects these species (which I saw in the Rhodesia Museum) are different. *N. arnoldi* is much more robust than *N. meadewaldoi*. Finally, *N. tricoloripes* is certainly very near *N. calida*, Westw., but the underside of apical part of abdomen (figured by Westwood) is different, and Westwood says nothing of red on legs or antennae dark at end. It thus appears that these smaller African species of *Nomia* ring the changes on a certain number of characters, producing a great variety of allied species, which are not easy to differentiate. Unfortunately those described are not all gathered together in any one museum.

The great variety of species of this genus in Africa is well shown by my experience with the material now under discussion. Last year I borrowed the undetermined *Nomia* from the Imperial Institute of Entomology. I described the more obviously new and distinct species, and determined the known ones so far as I could. There remained a considerable residue which I set aside, thinking that they could best be studied in connection with the collection I expected to bring back from Africa. On my return, I borrowed 40 species of *Nomia* which I had not seen (mostly Friese cotypes) from the American Museum of Natural History, and at the same time a series of undetermined species from the Belgian Congo, obtained by Lang and Chapin. I then made a table for all of these, including the Imperial Institute material, and species I brought back from Africa, so far as at present mounted. I had also examined authentic material of many species in the South African Museums.

Of the 40 species I borrowed as just mentioned, only two were represented in the other collections included in the table. These collections included, however, about a dozen described species which I already possessed, and some others readily determined from descriptions. The Imperial Institute series (not including those previously recorded) includes 21 species, of which two are also in the collections of my expedition, but none in the Lang and Chapin collection. The Lang and Chapin series has 14 species, of which four were also brought back by my expedition. Finally, we got 14 species not represented in any of the other lots cited. It thus appears that Africa must possess an enormous number of species of *Nomia*, making all allowances for the probable fact that some of the recorded species may have been described twice, from the opposite sexes.

Nomia tricoloripes, sp. n.

♂. Length about 8·5 to 9 mm., anterior wing a little over 6; black, with broad head and rather robust abdomen; mandibles obscurely reddish except at end; face and front densely covered with yellow hair, entirely hiding the surface; vertex dull, the punctures hardly visible under a lens; scape black, with long outstanding yellow hair; second joint also black, but the long flagellum black above and pale red beneath, the separation of the two colours sharp, but the last three joints entirely black, except a very narrow red line above and below; mesothorax, scutellum and post-scutellum densely covered with dusky fulvous (almost olivaceous) felt like tomentum, hiding the surface; sides of thorax with pale yellowish hair, becoming white on lower part of pleura; posterior truncation of metathorax entirely dull, but basal area with a broad transverse shining band, which is crossed, not very densely, by strong plicae; tegulae rather large but ordinary, clear ferruginous, the anterior half covered by fulvous tomentum; wings dusky hyaline, the apical margin distinctly but not greatly darker; stigma rather small, dull red, nervures fuscous, the more basal ones fulvous; basal nervure meeting nervulus; second cubital

cell square, receiving first recurrent nervure about or slightly beyond middle; coxae and trochanters (except middle and hind ones apically) black; anterior and middle femora light red above, on inner face and at base, but beneath, except at base, broadly cream-colour; their tibiae light red with a broad cream-coloured stripe, enlarged at apex; their tarsi cream-colour, except the last joint, which is pale red; anterior tarsi ordinary; hind femora greatly swollen but not trigonal, with a strong tooth beneath; these femora are black above to somewhat beyond middle in anterior view, but posterolaterally nearly to apex, below the black (especially on outer side) is an area of pale red, but the broad apical part is pale yellowish; hind tibiae pale yellow with a large red saddle, the apical anterior corner greatly produced and pointed; hind tarsi coloured like the others; abdomen dull, first tergite with a very broad band of fulvous hair across disc; all the tergites with broad apical bands of light red tomentum, the apical region appearing covered; second sternite highly polished basally, and with a pair of broad obtuse tubercles; third minutely punctured, and with a very broad light margin; apical region, beyond the third sternite, complicated, with a very large broad plate (black basally, but with broad translucent margin) on each side, a triangular reddish hairy process in middle, beyond this a depressed black area, with a rufous tubercle in middle, and apically with two large contiguous tufts of rufofulvous hair.

Kenya: Masai Reserve, 27 April and 9 May, 1913 (*T. J. Anderson*).

Another specimen, from Azare, N. Nigeria, 1926 (*Dr. L. Lloyd*), differs in having the abdominal bands much paler, hardly red; the hind femora considerably more swollen, with the black reduced to a patch above (which is obscured by fulvous hair) and a sharply defined elongate oval spot on inner side near apex; while the hind tibiae have the red saddle on outer side largely blackened, and the apical process is shorter and less pointed; also, the anterior and middle tibiae are orange, with the darker part not very evident, and the flagellum is more infuscated apically. In the wings, the first recurrent nervure joins the second cubital cell well beyond the middle. Yet the structure of the abdomen beneath is essentially the same, and in spite of all these differences it seems best to regard the insect as a subspecies only.

Still another specimen, with the same abdominal structure, is labelled Nlei, April 3, 1912, Masai Reserve (*T. J. Anderson*). It differs from *N. tricoloripes* in the abdominal bands, which are broad, dull white (the colour tegumentary); the distinctly more shining abdomen; the dull greyish tomentum of thorax above, but with a dull white band across postscutellum; the basal transverse channel of metathorax much narrower, angular, and much more closely and finely plicate; first recurrent nervure far beyond middle of second cubital cell, even beyond end of second third; the femora, tibiae and tarsi yellow (reddened by cyanide), but the hind femora with the black patch above; flagellum red beneath to end. The hind femora are not more enlarged than in *N. tricoloripes*.

Perhaps these insects should stand as full species, but they are clearly derived from a common stock, and at present I give them subspecific rank.

The following table will serve for ready recognition:

Tooth on hind femur rudimentary; hind tibiae entirely red, little produced apically; antennae dark, with third joint red beneath (Kigonsera). *rubripes*, Friese.

Tooth on hind femur well developed; antennae with no contrasting red spot on third joint . . . . . 1.

1. Hind femora entirely dark brown, little swollen; stigma large, pale orange (Bothaville) . . . . . *fulvipes*, Friese.

Hind femora bicoloured or tricoloured . . . . . 2.

2. Hind femora with abundant extremely long hair above; hind tibiae red, hairy, little produced at end; flagellum dark red beneath (Angola).
welwitschi, Ckll.
Hind femora with much shorter hair above; hind tibiae bicoloured or all yellow . . . . . 3.
3. Hind femora greatly swollen; abdominal bands pale (Azare, N. Nigeria).
tricoloripes **azarensis,** subsp. n.
Hind femora moderately swollen . . . . . 4.
4. Abdominal bands dull white (Masai Reserve, 3 April, 1912).
tricoloripes **pallidicincta,** subsp. n.
Abdominal bands cinnamon red . . . . . *tricoloripes*, sp. n.

Nomia snelli, sp. n.

♂. Length about 10 mm., anterior wing 6·8; black, rather robust, facial quadrangle conspicuously longer than broad; face and front densely covered with fulvous hair; mandibles dusky reddish in middle; antennae long, flagellum dark red beneath, third antennal joint with a brighter spot; mesothorax thinly clothed with fulvous hair, not hiding the glistening densely punctured surface; scutellum and postscutellum with dense rather long fulvous hair; channel at base of metathorax narrow, dull, with fine plicae; sides of thorax with pale fulvous hair; tegulae somewhat enlarged (but not of the large type), anteriorly whitish, posteriorly elevated and light red; wings subhyaline, more dusky apically; second cubital cell square, receiving recurrent nervure not far from end; legs with much pale fulvous hair; anterior and middle femora red in front, behind and at apex; anterior and middle tibiae red, the latter with an elongate blackish mark on outer side, and the apical portion inclined to cream-colour; all the tarsi light red; unusually hairy; hind femora moderately swollen, with a very strong tooth below, they are black, with a large dusky red patch on outer side apically; hind tibiae light red, very hairy, little produced at apex; abdomen densely punctured, somewhat shining; dark parts of tergites, seen in lateral view, with short hair, reddish on first three tergites, then dark brown, and then black; depressed margins of tergites testaceous, with thin pale fulvous hair-bands, no distinct band on sixth, which has much black hair; third sternite emarginate at apex, or rather, bituberculate.

Zanzibar, Jan.–Feb., 1925 (*H. J. Snell*). There is also one from the same collector, labelled Nazi Moja, Oct.–Dec., 1924. For discussion of relationships, see above. In my table it falls next to *N. capensis* (Friese), differing by the wings not strongly clouded at apex, and the first tergite having a hyaline margin.

Nomia gowdeyi, sp. n.

♂. Length 10·5 mm., anterior wing 7·7 mm.; black, with the mandibles reddish in middle, flagellum very obscure red beneath, brighter toward end; head broad, orbits conspicuously converging below; sides of face with abundant creamy-white hair; clypeus (denuded) dull and excessively densely and minutely punctured, the punctures running into fine striae, but the upper margin is rather narrowly shining; supraclypeal area with a median shining elevation; front and vertex entirely dull and thinly hairy, region behind ocelli with long fulvous hair; antennae fairly long; mesothorax and scutellum (which is not bigibbous) entirely dull, with short pale greyish-brown tomentum, the postscutellum with a band of dull whitish tomentum; channel at base of metathorax very narrow, shining, with feeble plicae; tegulae pale testaceous; wings strongly reddened, the apical margin infuscated; nervures ferruginous, becoming fuscous on outer part of wing; stigma small, clear, red, with no dark margin; basal nervure meeting nervulus; second cubital

cell about square, receiving recurrent nervure beyond middle; legs black at base, but otherwise largely red; anterior and middle femora, tibiae and tarsi red, the femora (especially the middle ones) blackened above, the tibiae on outer side near base with a dusky spot, large and conspicuous on middle ones; anterior tarsi with a rather long fringe behind; hind femora greatly swollen, but not trigonal, black above, with very long fulvous-tinted hair, the lower half red, with a single sharp tooth; hind tibiae red, outwardly near base with a dusky mark, inconspicuous because covered with hair, on the inner face with a large and conspicuous black patch; the tibiae are broadened apically, subtrigonal; hind tarsi clear red, the basitarsi long; abdomen broad, densely punctured, tergites 1 to 5 with hyaline margins, thinly covered with white hair; apex with a broad red plate, and white hair on each side of it; fourth sternite with a median keel, and a small red tubercle on each side of it, and margins of sternite laterally hyaline.

Uganda: Bwera, 6 April, 1913 (*C. C. Gowdey*). Very closely allied to *N. welwitschi*, Ckll., from Angola, but that has the middle femora shining very dark brown, clear red only beneath, the hind femora less swollen, the wings hardly reddened, the stigma dark, the nervures all fuscous, the elevated part of tegulae very dark brown. Yet they are evidently of the same immediate alliance. In Strand's table *N. gowdeyi* runs precisely to *N. kondeana*, Str., which is a much smaller species, with wing only 6 mm. The description of *N. quartinae*, Gribodo, seems nearly to apply, but that has the first recurrent nervure meeting the intercubitus, and there is no mention of any tooth on hind femur.

Nomia gowdeyi lacustris, subsp. n.

♂. With precisely the same general structures, including those of the abdomen beneath, but dense moss-like hair on thorax above fulvous; wing-veins paler and more delicate; second cubital cell much broader than high; third cubital with the face on third discoidal relatively much longer; hind femora with the red reduced and obscure. The face is densely covered with brownish-white hair, and the tongue is long and narrow.

Uganda: Entebbe, 16 Dec., 1912 (*C. C. Gowdey*).

The following from my table may help to place the species:

Abdominal bands indistinct; sixth tergite with black hair; face and thorax with fulvous hair; flagellum red beneath . . . . . *magnicornis*, Friese.
Abdominal bands conspicuous . . . . . 1.
1. Sixth tergite (seen in lateral view) with black hair; hind tibiae entirely pale red, with a tooth on inner side toward base . . . . . *tibialis*, Friese.
Sixth tergite (seen in lateral view) without black hair; hind tibiae with no such tooth; wings yellowish, dusky at end . . . . . *gowdeyi*, sp. n.

The wings may be called yellowish or reddish, the colour being yellowish-red.

Nomia somereni, sp. n.

♀. Length about 10 mm.; black, with chestnut-red legs, the red obscured by the heavy covering of pale hair; head not very broad, facial quadrangle longer than broad; mandibles obscurely reddish subapically; face and front densely covered with short pale greyish-fulvous tomentum, the back of the head also very hairy, but a more or less bare band across vertex; antennae rather long for a female, black, flagellum thick; mesothorax and scutellum densely covered with very short, felt-like reddish-fulvous tomentum, quite hiding the surface; hair of postscutellum reddish in middle, pale at sides; metathorax densely covered with pale tomentum, the basal channel linear and hardly noticeable; tegulae rufotestaceous, not enlarged; wings hyaline, with the apical margin (beginning at

level of end of marginal cell, and well beyond the cubitals) dark fuliginous, with a violaceous tint; stigma small and black, nervures brown; basal nervure meeting nervulus; second cubital cell square, first recurrent nervure joining second intercubitus (as in *N. quartinae*, Grib.); third cubital cell extremely long, longer than first two together; hair of legs all pale, light fulvous on hind tibiae, except below, where it is white; hind tibiae not especially robust; abdomen somewhat brownish, with thin pale fulvous hair, the surface dullish, very closely and finely punctured; tergites 2 to 4 with very broad bands of pale fulvous tomentum, which are not clearly limited anteriorly; fifth tergite with dark hair at base, and the apical fringe rufous basally, pallid apically; venter somewhat reddened, extreme sides of first two tergites red. Claws with two large divergent teeth.

Kenya: Rabai, May 1928 (*Dr. van Someren*). Resembles *N. perornata*, Ckll., by the dark end of wings, but differs by the short felt-like hair of thorax, hairy base of metathorax, etc. In Strand's table it falls nearest to *N. katonana*, Str., but that differs in the abdominal bands and the venation. It cannot be the female of *N. nubecula*, Sm., which has the dark cloud beginning at end of third cubital cell.

If *Nomia* is eventually split into a number of genera, this species and the one just described will hardly be regarded as congeneric. In *N. lacustris* the maxillary palpi are long, with long slender joints; the labial palpi have the first joint stout and very long, reaching about to the end of the maxillary palpi (when both are directed forward), the other three (successively shorter than one another) resembling joints of the maxillary palpi. In *N. somereni* the maxillary palpi are short, the second joint conspicuously the longest; the labial palpi are very short, the first joint reaching about to the end of fourth joint of maxillary palpi. No doubt these distinctions imply differences in the habits of the insects.

NEW EXOTIC SPECIES IN THE GENUS *ECNOMUS* (TRICHOPTERA) (2)

By Martin E. Mosely, F.E.S.

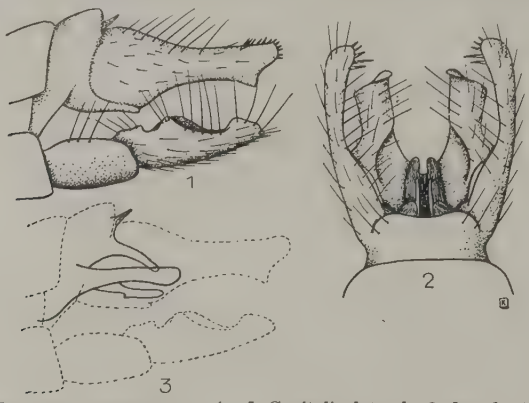
This paper continues the descriptions of new exotic species of *Ecnomus* which appeared in a paper published in 1932, *Trans. Ent. Soc. Lond.*, **80**: 1–17. Whilst this was in the press, a collection of Trichoptera was received from Pusa, Bihar, India, and included were four new species of *Ecnomus* whose descriptions are given below.

Ecnomus pusanus, sp. n. (Figs. 1–3.)

The general appearance of this species is similar to that of *Ecnomus tenellus*, Rambur.

Genitalia ♂. Terminal dorsal segment produced in the centre to a wide concave apical margin, beyond the centre of which may be seen two membranous plates, probably part of the upper penis-cover; seen from the side, the 10th tergite is divided from the sternite by a rounded excision. Superior appendages from above long, widely divergent, rather stout at their bases, constricted towards their centres, apices clavate and clothed on their inner surfaces with stout bristles; from the side they are very stout at the base constricted before the apices, which are obliquely truncate, with the lower apical margins produced in slight angles; upper penis-cover from above in the form of two narrow spines which,

from the side, are seen to originate at the base of the two membranous plates already mentioned, and curve over on to the penis which, from above, is deeply cleft; beneath the penis is a spatulate plate or lower penis-cover, the lower margin showing a hook-like projection. Inferior appendages, from the side, rather long, lower margin straight, upper twice excised to form three angular projections, of which the central is the largest; from



FIGS. 1–3.—*Ecnomus pusanus*, sp. n., ♂. 1, Genitalia lateral; 2, dorsal; 3, penis, upper and lower penis-cover, lateral.

beneath, the appendages are slightly divergent, apices obliquely truncate, a strong angle towards the centre of the outer margin; from above, the inner apical angles are slightly inturned.

Length of anterior wing, 5 mm.

Type ♂, abdomen mounted in balsam, in the British Museum; Pusa, Bihar (*U. Bahadur*) 5.xi.16.

Paratypes ♂ and ♀, Pusa, Bihar (*U. Bahadur*) 1.xi.16, 2.xi.16, 23.xi.16, in the British Museum and in the Entomological Section, Imperial Institute of Agricultural Research, Pusa, Bihar, India.

Ecnomus fletcheri, sp. n. (Figs. 4–6.)

The general appearance of the species is similar to that of *Ecnomus tenellus*, Rambur.

Genitalia ♂. Terminal dorsal segment from above strongly produced and bearing an even row of hairs; superior appendages, from above, short and divergent, apices lined internally with very strong black spines; from the side, broad, lower margins convex. Upper penis-cover from above appears as a pair of short narrow blades; from the side, the plates broaden considerably at their apices and have somewhat the appearance of a pair of anvils; there is a small wart above each plate armed with two or three long bristles. Penis, from above, long dilated towards the base, narrowing to an acute apex; from the side, upper margin produced in a finger-like process. Inferior appendages from the side somewhat reniform, lower margin produced towards the centre in a slight angle; from above the apices turn slightly upward and inward.

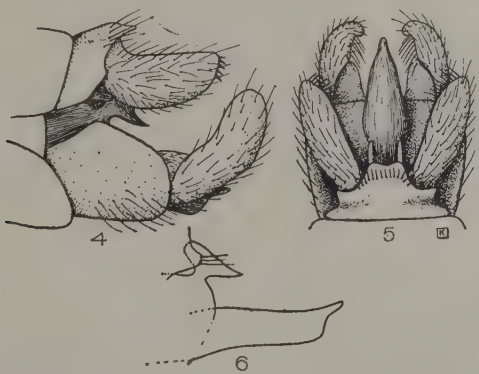
Length of anterior wing, ♂ 5 mm.

Type ♂, in the British Museum Collection; Palnis, 7000 ft. Kodai Kanal, 9.x.1921. Fletcher Coll.

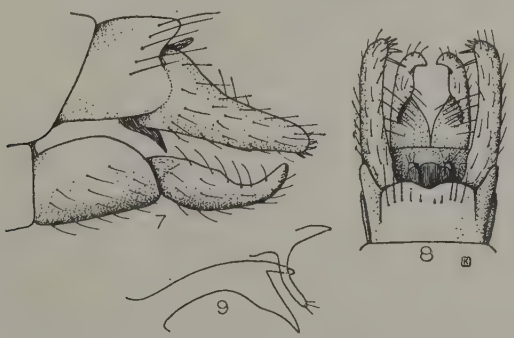
Ecnomus falcatus, sp. n. (Figs. 7–9.)

The general appearance of this species is similar to that of *Ecnomus tenellus*, Rambur.

Genitalia ♂. The margin of the terminal dorsal segment is slightly excised, the two transparent plates belonging to the upper penis-cover appearing beyond the margin at its centre. Superior appendages from above, long, slightly broader at the bases than at the



Figs. 4–6.—*Ecnomus fletcheri*, sp. n., ♂. 4, Genitalia lateral; 5, dorsal; 6, penis and upper penis-cover lateral.



Figs. 7–9.—*Ecnomus falcatus*, sp. n., ♂. 7, Genitalia lateral; 8, dorsal; 9, penis and upper penis-cover lateral.

apices the inner surfaces of which are armed with five or six stout spines, strong bristles lining the inner margins. From the side, they are broad at the base, gradually tapering to blunt apices. At the base of each appendage is a rounded wart on the inner surface armed with a few stout bristles. Upper penis-cover, from the side, appears as a pair of long, slightly curved processes slanting downward over the penis, each apex armed with three spines or bristles. Penis from the side bifurcate, upper branch short and acute, directed backward, lower branch longer and sinuate, tapering to a fine point and also directed backward. Inferior appendages from the side, broad at the bases tapering abruptly to the upcurved apices; there is an angular projection towards the centre of each appendage

on its upper surface; from above the upper margin is folded slightly inwards, the apices are directed upward and inward. Terminal ventral segment much produced, apical margin truncate.

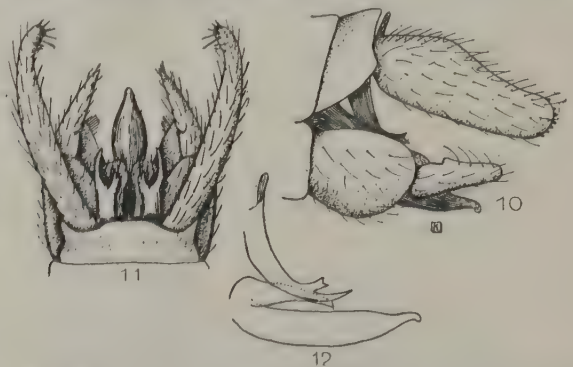
Length of anterior wing, ♂ 5 mm.

Type ♂ in the British Museum Collection, Central Provinces, Chicalda, 3600 ft., 24.i.19. A.G.R. Coll.

Ecnomus montanus, sp. n. (Figs. 10–12.)

The general appearance of this species is similar to that of *Ecnomus tenellus*, Rambur.

Genitalia ♂. Margin of terminal dorsal segment from above, sinuate, from the side, outer margin slightly concave, sternite very broad, lower margin convex. The transparent plates of the upper penis-cover scarcely project beyond the margin of the terminal dorsal segment and, from the side, are directed upward; superior appendages long and narrow, inner margins concave, apices turned slightly inward and armed with stout spines; upper



Figs. 10–12.—*Ecnomus montanus*, sp. n., ♂. 10, Genitalia lateral; 11, dorsal; 12, penis, upper penis-cover and penis-sheaths, lateral.

penis-cover very complicated; apart from the membranous plates, seen from above, there is a pair of strongly chitinised bifurcate processes, outer forks more than twice the length of the inner which are also bifurcate; three stout bristles arise along the apical margin of each process; beneath them is a pair of flat plates with broad rounded apices (possibly penis-sheaths); from the side, these plates curve slightly downward, the bifurcate process curving downward and tailward above them with the apex directed slightly upward; penis long and broad, tapering abruptly at the apex. Inferior appendages small and narrow; from above, tapering to very acute apices; from the side, the upper margin carries an angular projection about midway, directed towards the base.

Length of anterior wing, ♂ 5 mm.

Type ♂, in the British Museum Collection; Kashmir, 5200 ft., Srinagar, 24.viii.1923. Fletcher Coll.

Paratype ♂ in the collection of the Entomological section, Imperial Institute of Agricultural Research, Pusa, Bihar, India, labelled, Kumaon Ramgarh, 6000, 21–26.viii.18. Fletcher Coll.

Reference.

Mosely, M. E. 1932. Trans. Ent. Soc. Lond., **80**: 1–17, figs. 1–45.

THE REDISCOVERY OF *COLOPHON THUNBERGI*, WESTW., WITH DESCRIPTIONS OF FURTHER NEW SPECIES OF THE GENUS (COL., LUCANIDAE)

By K. H. Barnard, D.Sc., F.L.S.

The single ♂ specimen on which Westwood based his species *thunbergi* apparently had neither the locality nor the collector's name attached to it. It is now in the Hope Collection at Oxford, and bears no such label. Parry (1872) mentioned having added a specimen of this species to his collection, but gave no locality. Mons. R. Oberthür, who purchased a portion of Parry's collection, informs me that he has two specimens of *Colophon* in his collection. One of these bears two labels, viz. (*a*) "Swellendam, S. Africa." (*b*) "*Colophon thunbergi* ♂ Westw. Tr. Entom. Soc. ser. 3. 198. 3 × fig. 3. [sic] Swellendam, S. Africa." The other specimen also bore two labels, viz. (*a*) "♂ spec. see Waterhouse." (*b*) "*Colophon westwoodi* Gray. S. Africa. ex Mus. Halle." Oberthür adds that he considers both these specimens to belong to the same species.

Oberthür's information was received too late for incorporation in my study of the genus (1929, *Trans. Roy. Soc. S. Afr.*, **18** : 163–182), which showed that *westwoodi* and *thunbergi* were two perfectly distinct species, the former being confined to Table Mountain. Whether Oberthür's conceptions of the species are mistaken or his specimens wrongly identified is beside the point. The important fact is that one of the specimens bears a definite locality label.

On my first visit to the Langeberg Range in the neighbourhood of Swellendam, I was unfortunate in obtaining no ♂ specimens. From the occurrence of the species *izardi* on the same range farther eastward, it was assumed that this latter species would be found also on the Swellendam portion of the range and that some other locality should be searched for the missing *thunbergi*.

Westwood gave no reason for naming his species after the traveller Thunberg, but it is by no means improbable that the original specimen had been collected by Thunberg. In those days collectors were not always punctilious in giving precise locality labels, and Thunberg on his way from the *village* of Swellendam passed through Tygerhoek, River Zonder End (*Thunberg's Travels*, London, 1793), one of the Dutch East India Company's outposts which was included in the magisterial *district* of Swellendam. A particular search along the River Zonder End range was therefore made by myself and several friends, but without discovering any trace of a *Colophon*.

Recently, however, a second visit to the Swellendam mountains has at last led to the rediscovery of the elusive species *thunbergi*. The specimens were found on Zuurbrak Peak, on the west side of the Tradouw Pass, some 12–14 miles from the peaks in the immediate vicinity of Swellendam. Although not quite agreeing with the holotype in all respects, they are unquestionably referable to Westwood's species, and confirm the accuracy of the locality label on Oberthür's one specimen. It remains for future collecting to determine how much farther *westwards* from Swellendam along the Langeberg Range this species extends. Further eastwards it seems to be entirely replaced by *izardi*. On Zuurbrak Peak the two species intermingle, though the dominant one is *thunbergi*. (Cf. map in *loc. cit.*, 1929.)

The descriptions of these specimens of *thunbergi* and of five more new species are given below. The new species bear the names of my mountaineering companions. A popular account of these mountain beetles, with figures of all the species except *thunbergi*, was given in the *Journal of the Mountain Club of South Africa*, No. 34 for 1931 (publ. 1932), with a view to stimulating local mountaineers to investigate some of the mountain areas which have not yet been specially searched for *Colophon*.

Colophon thunbergi, Westw.

1855, Westwood, Trans. Ent. Soc. Lond. (n.s.), **3** : 198, pl. 10, fig. 2.
1929, Barnard, Trans. R. Soc. S. Afr., **18** : 167, fig. 2.

These specimens conform with my description of the holotype except as follows : the dorsal basal tooth of the mandible is nearer the base and is directed more transversely inwards; the front tibia has the distal spatulate portion longer and there is a small third

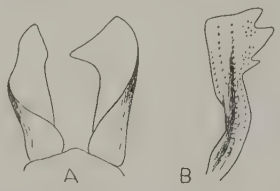


Fig. 1.—*Colophon thunbergi*, Westw. *a*, Lateral lobes of ♂ genitalia; *b*, dorsal view of front-tibia ♂.

tooth on the outer margin. Elytral flange costate and feebly corrugate. ♂ genitalia as figured. ♀ resembling that of *westwoodi*.

Length (from front margin of head to tip of elytra), ♂ 19–20 mm.; ♀, 17 mm. *Breadth* (of thorax), ♂ 11–12 mm.; ♀ 10 mm.

Locality. Cape Colony : Zuurbrak Peak, West side of Tradouw Pass; Langeberg Range, 4900 ft. (*K.H.B.* and *C. W. Thorne*), Febr. 1932.

Colophon neli, sp. n.

1932, Barnard, J. Mount. Club. S. Afr., **34** : 19 (fig. ♂, sine descr.).

Mentum flat, transversely quadrangular, sparsely foveolate. Head with lateral margin straight; upper surface in ♂ with oblique ridge over eye, declivous in front with a more or

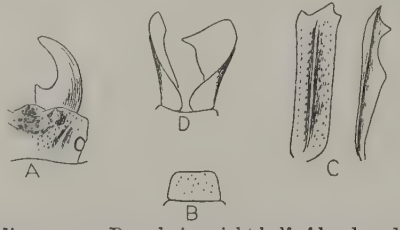


Fig. 2.—*Colophon neli*, sp. n. *a*, Dorsal view right half of head, and mandible, ♂; *b*, mentum; *c*, dorsal and lateral views of front tibia, ♂; *d*, lateral lobes of ♂ genitalia.

less pronounced ridge or compressed tubercle near insertion of mandible and bordering the declivity laterally; in ♀ anterior margin semicircular, the antero-lateral angles obsolete or

almost so, upper surface more strongly foveolate than in ♂. Postero-lateral margin of thorax slightly concave before the feebly quadrate angle. Mandible in ♂ strongly falcate, inner basal margin of lower surface produced as a tooth, apex acute, terete, not impressed, surface with very obscure punctae; in ♀ similar to that of *westwoodi* but inner margin nearly straight or slightly concave, not bisinuate. Front tibia in ♂ stout, straight, parallel-sided, very slightly expanded distally into a bifid tooth, sometimes only obscurely bifid, dorsal surface with a low blunt median longitudinal ridge, ventral surface with a sharp median longitudinal keel which is more or less semicircularly excised in the distal third; in ♀ similar to that of *westwoodi* but with less strongly developed teeth on outer margin. Lateral margins of elytra costate, no flange. ♂ genitalia as figured.

Length, ♂ 13–17 mm.; ♀ 14–15 mm. *Breadth*, ♂ 7·5–10 mm.; ♀ 7–8 mm.

Locality. Cape Colony: On the crest of the Zwartberg Range at the Zwartberg Pass (Prince Albert Division), 5500–6500 ft. (*K.H.B.*), Nov. 1929.

This is the smallest member of the genus hitherto discovered. It has the mandibles in the ♂ of the same type as those of *stokoei*, but the mentum, front tibia and genitalia are quite different. Named after Mr. C. J. Nel of Ladysmith (Cape Colony).

Colophon whitei, sp. n.

1932, Barnard, J. Mount. Club S. Afr., **34** : 20 (fig. ♂, sine descr.).

Mentum flat, transversely oblong, anterior margin slightly convex, sparsely foveolate. Head with lateral margin straight; upper surface in ♂ with low oblique ridge over eye, and

Fig. 3.—*Colophon whitei*, sp. n. *a*, Ventral view of mentum and mandible, ♂; *b*, dorsal view of right half of head, and mandible, ♂; *c*, right half of head, and mandible, ♀; *d*, ventral view front-tibia, ♂; *e*, lateral lobes of ♂ genitalia.

a very shallow oblique concavity separating the ridge from the slightly raised triangular median portion; in ♀ anterior margin semicircular, upper surface with a slightly raised triangular median area, more prominent posteriorly, more strongly foveolate than in ♂. Postero-lateral margin of thorax in ♂ distinctly concave before the quadrate angle. Mandible in ♂ with inner dorsal margin straight, followed by a semicircular excision extending to the falcate apex, inner margin ventrally forming a projecting tooth; in ♀ similar to that of

westwoodi. Front tibia in ♂ strongly expanded into a lateral keel, ending near apex where there is a semicircular excision before the apical bifid expansion, ventral surface with strong keel ending more or less rectangularly, a small tubercle on inner apex, otherwise concave; in ♀ similar to that of *westwoodi*, with blunt teeth. Elytral flange costate and corrugate in both sexes, but more strongly so in ♂ than in ♀. ♂ genitalia as figured.

Length, ♂ 23–26 mm.; ♀ 20–22 mm. *Breadth*, ♂ 13–15 mm.; ♀ 11–12 mm.

Locality. Cape Colony: Blesberg on east side of Meiring's Poort; Zwartberg Range (*F. Berrisford* and *P. C. Scott-Hayward*), March 1930; Blaauw Punt near Meiring's Poort Berg, 6500 ft. (*A. B. Berrisford*), March 1931; Meiring's Poort Berg and Spitzkop, 6500–6900 ft. (*K.H.B.* and *C. W. Thorne*), Febr. 1932. Some alive.

This very fine and large species is somewhat like *thunbergi* in the mandibles, but the inner dorsal margin is longer and almost conceals the ventral tooth; the front tibia is quite different. Named after Mr. K. White.

Colophon cassoni, sp. n.

1932, Barnard, J. Mount. Club S. Afr., **34** : 19 (fig. ♂, sine descr.).

Mentum flat, though often somewhat pustulate, nearly semicircular, sparsely foveolate. Head with lateral margin straight; upper surface in ♂ with well-marked ridge over eye,

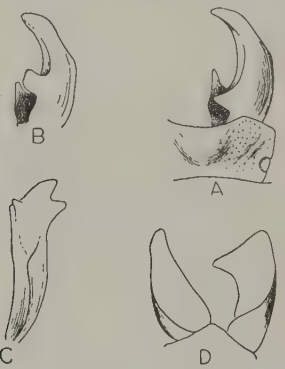


Fig. 4.—*Colophon cassoni*, sp. n. *a*, Dorsal view right half of head, and mandible, ♂; *b*, dorsal view right mandible, ♂, to show opposite extreme variation in position of dorsal basal tooth; *c*, ventral view front tibia, ♂; *d*, lateral lobes of ♂ genitalia.

declivous in front, the median area smooth without any, or with only very few and sparse, foveolae or punctae; in ♀ with slightly raised median triangular area, as in *whitei*, more strongly foveolate than in ♂. Postero-lateral margin of thorax in ♂ slightly concave before the rounded angle. Mandible in ♂ falcate, with an oblique basal tooth dorsally, and a straight narrowly pointed basal tooth ventrally; in ♀ as in *westwoodi*. Front tibia in ♂ nearly straight, not expanded laterally, ventral surface with a keel in proximal half, the distal end of the keel rounded, and a small tubercle on inner apex; in ♀ similar to that of *westwoodi*, with blunt teeth. Elytral margin costate, with a very narrow and slightly corrugate flange. ♂ genitalia as figured, the lateral lobes rather more elongate and slender than in *whitei*.

Length, ♂ 16 mm.; ♀ 14 mm. *Breadth*, ♂ 9–10 mm.; ♀ 8 mm.

Locality: Cape Colony: Blaauw Punt near Meiring's Poort, Zwartberg Range, 6500 ft. (*F. Berrisford* and *P. Casson Scott-Hayward*), March 1930; Meiring's Poort Berg, 6900 ft. (*K.H.B.* and *C. W. Thorne*), Febr. 1932.

The position and form of the basal dorsal tooth of the ♂ mandible varies (fig. 4). It may be either conical, or blunt and truncate or even slightly bifid. When conical it is usually placed near the base of the mandible and projects transversely or slightly proximally; when truncate it is nearer the middle of the mandible and projects transversely or forwards. The extreme forms occur in about the ratio of 1 (tooth conical and basal) to 3 (tooth truncate and median) but out of 33 heads the mandible of 4 or 5 show variations between the extremes. In one case where the tooth is basal, it is conical on the one mandible and subtruncate on the other. The front tibia and genitalia do not differ in the two forms.

One might be inclined to regard *whitei* as the extreme "high" race and *cassoni* as the extreme "low" race of one and the same species. As, however, the two forms are clearly distinct, apart from size, and no specimens showing the slightest hint of an intermediate stage have been discovered, it is better to regard them as distinct species.

Colophon berrisfordi, sp. n.

1932, Barnard, J. Mount. Club S. Afr., **34** : 19 (fig. ♂, sine descr.).

♂. Mentum flat, nearly semicircular, sparsely foveolate. Head with lateral margin straight; upper surface with low oblique ridge over eye, and a slightly raised subtriangular

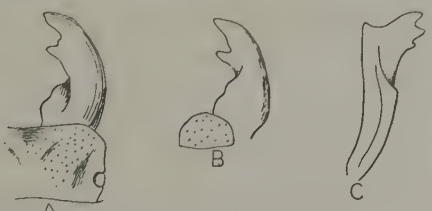


Fig. 5.—*Colophon berrisfordi*, sp. n. *a*, Dorsal view right half of head, and mandible, ♂; *b*, ventral view of mandible, and mentum; *c*, ventral view of front tibia, ♂.

median area, declivous in front. Postero-lateral margin of thorax very slightly concave before the rounded angle. Mandible somewhat like that of *westwoodi* but more elongate and the bifid apex more deeply excised, no dorsal basal tooth, inner margin ventrally forming an oblique slightly sinuate edge. Front tibia not very stout, not laterally expanded, apical expansion tridentate, ventral surface strongly keeled in proximal half, the keel ending subquadrangularly.

Breadth, 10 mm.

Locality. Cape Colony: Blaauw Punt near Meiring's Poort, Zwartberg Range, 6500 ft. (*F. Berrisford* and *P. C. Scott-Hayward*), March 1930, anterior half of one ♂.

Named after Mr. F. Berrisford. This form may possibly be only a chance "sport" of *cassoni*, but the dorsal tooth of the mandible is much nearer the apex than in any of the specimens of *cassoni*, and the ventral keel on front tibia is much stronger. On a recent visit to the Meiring's Poort mountains I failed to find any more examples of this species.

Colophon eastmani, sp. n.

1932, Barnard, J. Mount. Club S. Afr., **34** : 20 (fig. ♂, sine descr.).

♂. Mentum flat, semicircular, sparsely foveolate. Head with lateral margin expanded in front of eye; upper surface with well-marked ridge over eye, sparsely and feebly punctate. Postero-lateral margin of thorax almost evenly rounded, the angle obsolete. Mandible falcate, with a transverse narrow tooth on inner margin near the base dorsally, inner margin ventrally forming a square tooth which scarcely projects beyond the mentum. Front tibia with apical bifid expansion, upper surface rather strongly convex, but not sharply

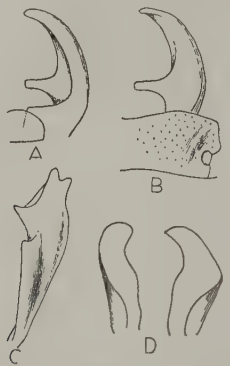


Fig. 6.—*Colophon eastmani*, sp. n. *a*, Ventral view of mentum and mandible, ♂; *b*, dorsal view of right half of head, and mandible, ♂; *c*, ventral view of front tibia, ♂; *d*, lateral lobes of ♂ genitalia.

keeled, ventral surface strongly keeled in proximal half, a short tubercle on inner apex. Elytral flange costate and more or less corrugate. ♂ genitalia as figured.

Length, 18–20 mm. *Breadth*, 11–12 mm.

Locality. Cape Colony: Keeromberg and Saw-edge Peak, Worcester District, 6000-6800 ft. (*K.H.B.* and *F. Berrisford*), Sept. 1930. Two live and several dead ♂♂.

Named after Mr. H. A. Eastman. This form is clearly related to *cameroni*, which occurs on the mountain range on the opposite side of the Hex River valley (Fonteintjesberg and Waaihoek Mts.), but is distinguished by the much narrower tooth on the mandible.

It may be noted that *cameroni* extends northwards from the Waaihoek Mts. across Michell's Pass to the Gt. Winterhoek, 6800 ft., at the north end of the Witzenberg Range (*K.H.B.*), Aug. 1929, without exhibiting any variation.

ON SOME USUALLY MISIDENTIFIED JAPANESE BUTTERFLIES (LEP. LYCAENIDAE)

By Captain A. F. Hemming, C.B.E.

(With Plate III.)

Few groups even of the much confused Palaearctic Lycaenids have been subject to such widespread misunderstanding as have the Japanese representatives of *Plebeius argus*, Linn. (1758) [= *aegon*, Schiff (1775)] and allied species. The following notes have been prepared in the course of work on the British Museum collection, and, as they are based on an examination of the types concerned, all of which are now in the Museum, it is to be hoped that they will serve to ensure the correct use of the various names in the future. I give first a short account of the five named forms and to this I add a summary of my conclusions and a short synonymy.

1. *Lycaena micrargus*, Butl. (1878).

Described as a separate species by Butler, this is, in fact, the subspecies of *Plebeius argus*, Linn., found on the main island (Hondo) of Japan. Butler's type, a ♂ taken by Fenton at Tokyo, is in the British Museum. At some period, it lost its abdomen, that now attached to it being a female, not a male one. Apart from its general appearance it can, however, definitely be identified as a subspecies of *argus*, Linn., and not of the allied Japanese species, wrongly identified by recent writers as *insularis*, Leech (with which I deal later), by reason of the fact that the fore-leg bears a well-developed spine on the front tibia. (This character is well shown in a photograph by F. N. Clark reproduced by Tutt on plate 24 of Vol. 3 of his *British Butterflies*.) This subspecies is a dark purplish blue on the upperside in the male and is characterised by the wide black marginal border to the fore-wings and the large black submarginal spots on the hind-wings.

Oberthür (1910) redescribed this subspecies under the name *Lycaena aegon* var. *japonica*. The figures which he gave of his types were subsequently copied (very crudely) in Seitz's Supplement.

Of the specimens other than the type discussed by Tutt under the name *micrargus*, the specimen from Kisogawa is correctly identified, but the specimens from Asahigawa, Hokkaido are *pseudaegon*. On the other hand, the specimens from Nikko attributed by him to *pseudaegon* are, in fact, *micrargus*.

The principal confusion that has arisen in regard to the identity of *micrargus* is, however, due to a mistake in identification subsequently made by Chapman, which arose in the following way. When in 1917 Chapman discovered that there existed in Europe a species (which he named *aegus*) that had till then been confused with **Lycaeides argyrognomon*, Bergst. (1779), he made a careful

* An explanation of the use, in this paper, of the generic names *Plebeius* and *Lycaeides* will be found in my "Notes on the Generic Names of the Holarctic Lycaenidae" (1929, *Ann. Mag. Nat. Hist.*, (10) **3** : 238, 233). In view of a recently published note on these genera (1932, *Ent. Rec.*, **44** : 40), it seems desirable again to draw attention to the fact that the author of the former name is Kirby and not Linnaeus.

examination of the whole series of specimens at that time arranged under the latter name in the British Museum collection. As the result of that examination, he concluded that the European and Asiatic forms till then identified as subspecies of *argyrognomon* belonged, in fact, to four distinct species, viz.

(a) *argyrognomon*, Bergst., from Europe and the Transcaucasus.

(b) *aegus*, Chapman. Geneva.

(c) *sareptensis*, Chapman. Sarepta.

(d) A species which included all the then named forms from Continental Asia and Japan and which had hitherto been regarded as subspecies of *argyrognomon*.

In order to find a name for his fourth species, as defined above, Chapman looked through the names in the Museum collection with a view to determining which was the oldest. Unfortunately he selected for this the name *micrargus*, Butl., as at that time there stood under that name in the collection (as a subspecies of *argyrognomon*) a series of the totally different insect which in 1921 Verity named *praeterinsularis*. Some of the actual specimens misidentified by Chapman as *micrargus* and of which he dissected the genitalia that he figured in 1917 under that name are in the Museum collection, together with Chapman's genitalia preparations.*

The genuine *micrargus*, Butler, is represented in the British Museum collection by 42 specimens (♂ 34, ♀ 8) from Tokyo, Nikko (4000–5000 ft.), Kisogawa, Oiwake (locality doubtful), and Yokohama. In the Hemming collection (♂ 11, ♀ 6) there are specimens also from Fujisan and Asama-yama.

It appears to be double-brooded, as of the specimens from Nikko in the British Museum some were taken in June (7.vi.1914) and others in August (1–3.viii.1904).

2. *Lycaena pseudaegon*, Butler. (Pl. III. fig. 3, 4.)

and

Lycaena argus, Linn., var. *insularis*, Leech. (Pl. III. fig. 1, 2.)

Butler's types of *pseudaegon* (♂ 2, ♀ 2), now in the British Museum collection, correspond closely with the description which he gives, except that he omitted to mention that they were worn specimens and therefore that the blue on the upperside was more lilac blue and less silvery blue, and the fore-wing marginal borders (on the upperside) in the males appears narrower than would have been the case in fresh specimens. The males on the upperside are a very pale lilac blue and the females are brown "very faintly shot with steel-blue at the base of the primaries." That *pseudaegon* is correctly referred to *argus*, Linn., as a subspecies is clearly shown by the genitalia of the ♂ paratype which I have been permitted to dissect and of which I give figures (Pl. III. fig. 3, 4).

The types were not available when Tutt (1909) discussed this insect, and the specimens to which he refers are not *pseudaegon*, that from Gensan, Corea, being a small example of *coreana*, Tutt, and those from Nikko being *micrargus*, Butl. On the other hand, the specimens from Asahigawa, Hokkaido, referred by him to *micrargus*, belong to *pseudaegon*.

Of the three specimens labelled "Oiwake, 1885, Leech coll." to which he refers under *pseudaegon*, the ♂ and one ♀ are *micrargus*, while the second so-called ♀ is, in reality, a ♂ of *Lycaeides cleobis*, Brem.

There remains to be considered another Hokkaido insect described by

* One of these is labelled "Wadatoge, C. Japan, 2000–5000 ft., 27.iii.04, *H. J. Elwes*," and the other "Amur, 1885, *Graeser*."

Leech (1893) as *Lycaena argus* var. *insularis* from specimens taken at Hakodate in June and July 1887. It is curious that Leech should have described this insect as a variety (*i.e.* subspecies) of what he called *argus*, Linn.* [*i.e. argyrognomon*, Bergst.], as the fore-leg in this insect bears a well-developed spine on the front tibia, a character found in varying degrees in all subspecies of *argus*, Linn. [= *aegon*, Schiff.], but one which is absent in all subspecies of *argyrognomon*, Bergst. I have been permitted to dissect the genitalia of two of the paratypes now in the Museum collection, one of which I figure (fig. 1, 2). These show beyond doubt that *insularis* should be associated with *argus* and not with *argyrognomon*.

Leech gives good figures of *insularis* and these were copied by Seitz (1909). As I explain later, Oberthür (1910) wrongly applied the name *insularis* to an entirely different insect (*praeterinsularis*, Verity) and in this has been followed by every subsequent writer.

Having thus established by an examination of the types that *pseudaegon* and *insularis* (both from the island of Hokkaido) are subspecies of *P. argus*, Linn., it is necessary to determine in what respect (if any) they differ from one another. The main characteristics of *insularis* noted in Leech's description (which is fully borne out by an examination of the type series in the British Museum) are, on the upperside, in the ♂, the pale silvery-blue of the ground-colour, and, in the ♀, the blue-grey suffusion of the fore-wings. It will be seen at once that these are exactly the characters noted by Butler as the distinguishing marks of his *pseudaegon*. A comparison of the types shows conclusively that *pseudaegon* and *insularis* are identical with one another. Thus the much misused name *insularis* disappears as a synonym of *pseudaegon*.

The British Museum collection contains the following series of *pseudaegon* :—

♂ holotype, ♀ allotype, and ♂ 1, ♀ 1 paratypes of *pseudaegon* from Iburi (*Fenton*).

♂ holotype, ♀ allotype, and ♂ 7, ♀ 6 paratypes of *insularis* from Hakodate, June–July 1887 (*Leech*).

♂ 2, ♀ 1 Asahigawa, 11–12.vii.1904 (*Elwes*).

There is considerable variation in size in the males, the fore-wing length ranging in the Hakodate specimens from 15 to 17 mm. The smallest specimen (the type of *pseudaegon*) measures 14 mm. The females only range between 14 and 15 mm.

3. *Plebeius insularis*, Leech, race *praeterinsularis*, Verity (1921). (Pl. III. fig. 5, 6.)

The types of *praeterinsularis* selected by Verity are the two specimens figured by Oberthür (1910) (*Et. lép. comp.*, **4** : on plate 42, fig. 305 ♂, 306 ♀) and wrongly identified by him as *insularis*, Leech. Verity was so struck by the great difference between the insects figured by Oberthür as *insularis* and Leech's figures of his types of *insularis* that he concluded that Oberthür's specimens required a new name, and he therefore called them *praeterinsularis*. Oberthür's specimens (*i.e.* Verity's types) are now in the British Museum. The male, which is labelled " Yokohama, 1891," is identical superficially with the insect which Chapman (wrongly) identified as *micrargus*, Butl., to which reference has already been made. Its genitalia, which I have been permitted to dissect, and which I figure, are identical with figures given by Chapman of the genitalia of his *micrargus*.

Actually until 1921 this insect had no valid name, having been

* The true *argus*, Linn., was referred to by Leech as *aegon*, Schiff.

called equally wrongly *insularis*, Leech, by Oberthür, and *micrargus*, Butler, by Chapman. Its valid name is, therefore, *praeterinsularis*, Verity. Chapman was perfectly correct in saying that his *micrargus* (*i.e. praeterinsularis*) is co-specific with a large number of named forms occurring in Continental Asia. Some Continental entomologists have modified Chapman's conclusions to the extent (*a*) that they regard *aegus*, Chapman (and its associated forms *ligurica*, Oberthür, etc.), as being co-specific with what Chapman called *micrargus* and (*b*) that they identify with one of these forms the insect named *Polyommatus ismenias* by Meigen in 1829. If these conclusions are correct, *praeterinsularis* and the forms from Continental Asia should be referred, as subspecies, to *ismenias*, Meig. I think that *ismenias* is probably co-specific with *aegus* and *ligurica*, but I am not prepared at present to accept the view that these European forms are co-specific with the Asiatic and Japanese forms.

If Chapman's (and my) view is correct, it will be necessary to determine which is the oldest of the Asiatic named forms in order to ascertain the specific name of the species (which Chapman called *micrargus*), of which the Japanese *praeterinsularis*, Verity, is a subspecies. Unfortunately, this is a point which cannot be settled with certainty, until the types of some of these forms, which are not at present available, have been carefully examined and their identity determined. For the moment, therefore, this must be regarded as an open question.

The British Museum collection contains specimens of *praeterinsularis* from Eastern Mongolia (Kara-usu), the Amur, the main island of Japan (Yokohama, Kisogawa, Wadatoge, and Nikko) and Kiu-shiu. In the Hemming collection there are also specimens from Asama-Yama and Fujisan.

Summary of Conclusions.

1. *Plebeius argus*, Linn., has two validly named Japanese subspecies, one of which occurs on the main island of Japan and the other on the North Island, Hokkaido.
2. The name of the main island subspecies is *micrargus*, Butl., of which *japonica*, Oberth., is a synonym.
3. The name of the Hokkaido subspecies is *pseudaegon*, Butler, of which *insularis*, Leech, is a synonym.
4. The correct name of the species of *Lycaeides* allied to *L. argyrognomon*, Bergst., found on the main island of Japan is *praeterinsularis*, Verity. This is the insect misidentified as *micrargus*, Butler, by Chapman and as *insularis*, Leech, by Oberthür (1910) and all subsequent writers.

Synonymy.

1. *Plebeius argus micrargus*, Butler.

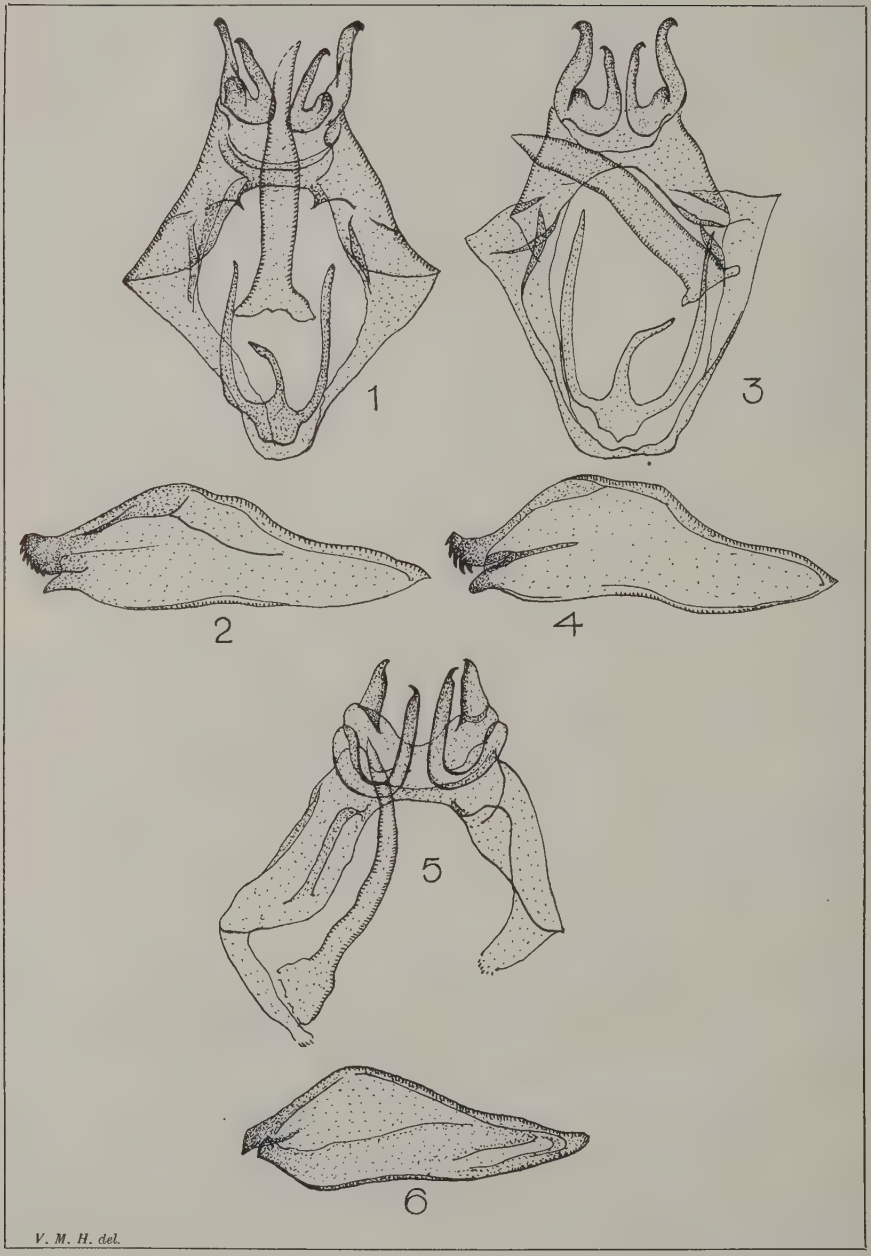
Butler, 1878, Cist. ent., **2** : 283 [*Lycaena* sp.] "Tokyo."
Elwes, 1881, Proc. Zool. Soc. Lond., **1881** : 889.
Leech, 1893, Butt. China, Japan, Corea, (2) : 301.
Tutt, 1909, Brit. Butt., **3** : 200.
Seitz, 1909, Macrolep., **1** : 300.
Verity, 1931, Iris, **45** : 39.

japonica, Oberthür.

Oberthür, 1910, Et. lép. comp., **4** : 670, pl. 42, fig. 313 ♂, 314 ♀ [*Lycaena aegon* race] "Japon."
Bollow, 1930, in Seitz, Macrolep., Suppl. **1** : 259, pl. 16, fig. F 4, 5 ♂, 6 ♀.

pseudaegon, Butler, Tutt *nec* Butler.

Tutt, 1909, Brit. Butt., **3** : 201 (*pro parte*).
Verity, 1931, Iris, **45** : 39.



Male Genitalia of *Plebeius* **and** *Lycaeides.*

2. *Plebeius argus pseudaegon*, Butler.

Butler, 1881, Proc. Zool. Soc. Lond., **1881** : 851 [*Lycaena* sp.] " Iburi, Hokkaido."
Leech, 1893, Butt. China, Japan, Corea, (2) : 301.
Tutt, 1909, Brit. Butt., **3** : 200 (*pro parte*).
Seitz, 1909, Macrolep., **1** : 300.

insularis, Leech.

Leech, 1893, Butt. China, Japan, Corea, (2) : 302, pl. 31, fig. 5 ♀, 8 ♂ [*Lycaena argus* var.] " Island of Yesso, Hakodate."
Seitz, 1909, Macrolep., **1** : 300, pl. 78, fig. D 2, 3 ♂, 4, 5 ♀.

japonica, Oberthür, Verity *nec* Oberthür.

Verity, 1931, Iris, **45** : 39.

3. *Lycaeides praeterinsularis*, Verity.

Verity, 1921, Ent. Rec., **33** : 175 [*Plebeius insularis* race, nom. nov. pro *insularis*, Oberthür (1910)] " Yokohama."
Bollow, 1930, in Seitz, Macrolep., Suppl. **1** : 259.

insularis, Leech, Oberthür *nec* Leech.

Oberthür, 1910, Et. lép. comp., **4** : 200, pl. 42, fig. 305 ♂, 306 ♀.
Courvoisier, 1914, Iris, **28** : 201.
Oberthür, 1916, Et. lép. comp., **12** : 483.
Matsumura, 1916, Ins. mats., **1** : 29, pl. 2, fig. 13 ♀ (ab.).
Reverdin, 1917, in Oberthür, *Ibid.*, **14** : 25.
Courvoisier, 1917, in Oberthür, *Ibid.*, **14** : 35.
Verity, 1921, Ent. Rec., **33** : 175.
Beuret, 1928, Soc. ent., **43** : 42, fig. 13, 25 (genit.).
Matsumura, 1929, Ill. Common Ins. Japan, **1** List : 31.
Bollow, 1930, in Seitz, Macrolep., Suppl. **1** : 259.
Heydemann, 1931, Int. ent. Z. Guben, **25** : 132.
Beuret, 1931, Ent. Rundsch., **48** : 213.
Stempffer, 1931, Ann. Soc. ent. France, **100** : 125, pl. 2, fig. J. K (genit.).
Stempffer & Schmidt, 1932, Int. ent. Z. Guben, **25** : 429, 452, 454, pl. 1, fig. 24 ♂, pl. 2, fig. 24 ♂.
Heydemann, 1932, Ent. Rundsch., **49** : 35.

micrargus, Butler, Chapman *nec* Butler.

Chapman, 1917, in Oberthür, Et. lép. comp., **14** : 42, 45, 46, 51–53, pl. 9, fig. 27 (genit.), pl. 10, fig. 28–30 (genit.), pl. 11, fig. 31–33 (genit.).
id., 1918, Ent. Rec., **30** : 4–7, pl. 3, fig. 9 (genit.).

argus, Linn., Matsumura *nec* Linn.

Matsumura, 1932, Ill. Common Ins. Japan, **1** : 27, pl. 10, fig. 6 ♂ ['♀'].

Explanation of Plate III.

Male Genitalia of *Plebeius* and *Lycaeides*.

Figs. 1, 2. *Lycaena argus*, Linn., var. *insularis*, Leech. Paratype " Hakodate, June–July 1887 " (*J. H. Leech*) (B.M. Slide No. L. 580 A.F.H.).
3, 4. *Lycaena pseudaegon*, Butl. Paratype " Hokkaido, Iburi, July " (*Fenton*) (B.M. Slide No. L. 640 A.F.H.).
5, 6. *Plebeius insularis*, Leech, race *praeterinsularis*, Verity. Type. " Japon, Yokohama 1891 " (ex *Oberthür* coll.) (B.M. Slide No. L. 643 A.F.H.).

Note.—All the specimens figured are drawn by *camera lucida* to a uniform scale. Figs. 1, 3, and 5 show the ventral aspect of the genitalia with aedoeagus, both clasps having been removed. Figs. 2, 4, and 6 are drawings of individual clasps.

All the specimens from which the preparations illustrated have been made are in the British Museum.

THE INDIAN SPECIES OF *TIPULA* (DIPTERA, TIPULIDAE). PART I

By F. W. Edwards, M.A., Sc.D., F.E.S.
(*British Museum, Natural History.*)

In this and subsequent papers I propose to give some account of the members of the large genus *Tipula* occurring in British India (including Ceylon and Burma).

Since the publication of Brunetti's volume on the Nematocerous Diptera in the *Fauna of British India* very great strides have been made in our knowledge of the Tipulidae, and material of a good many new species has accumulated in the British Museum. The opportunity will be taken to describe these, and also to give additional notes on the types of the species described by Brunetti and others, the types of most of which have been examined by the writer. A large proportion of the new material is due to the energetic collecting of Mr. T. Bainbrigge Fletcher, to whom the Trustees of the British Museum are indebted for the presentation of the types of many of the novelties described in these papers as well as much other valuable material in the family.

The classification of the genus *Tipula* adopted here is that outlined by me in a recent paper,* and the subgenera and species-groups will be discussed in turn. The present instalment deals only with the subgenus *Tipulodina*.

Subgenus *Tipulodina*, End.

This subgenus comprises a considerable number of slenderly-built species nearly all of which have conspicuous white rings on the tibiae and usually also on the tarsi, a type of colouring which is not found in any other group of *Tipula*; all species of *Tipulodina* also possess a conspicuous dark mark at the tip of the wing on the costal margin, a feature which will serve to distinguish them very readily from those species of *Dolichopeza* which have black and white legs. About thirty species are at present known in the Oriental and Austro-Malayan regions, eleven of these occurring in British India. The species may be placed in two main groups, defined as follows :—

A. The *pedata*-group. Front femur without a white ring, at most with a rather ill-defined yellowish ring close to the tip. Wings with a dark mark across middle of lower basal cell.

B. The *venusta*-group. Front femur with a conspicuous white or cream-coloured ring close to the tip. Wings without any dark mark across middle of basal cell.

A few species occurring outside India do not fit well into either of these groups; for example *T. fumifinis*, Walk. (= *longicornis*, Dol., = *schummeli*, Brun.), of Amboina has no white rings on either femora or tibiae and no dark mark in middle of basal cell.

The species differ greatly in the form of the male hypopygium, but there can be no doubt that all are rather closely related. A feature common to many species (but more pronounced in some than in others) is the great reduction of the axillary area of the wing, a condition occurring also in the subgenus *Indo-*

* 1931, *Ann. Mag. Nat. Hist.* (10), **8**: 73–82.

tipula. These two Oriental subgenera are probably rather nearly related and belong to the same original stock, in spite of striking external differences.

A. *pedata*-group.

1. **Tipula (Tipulodina) monozona,** sp. n.

♀ *Head* dark grey on nape, this colour extending forwards in middle almost to level of antennae; face and rostrum (except a narrow band at sides) ochreous; practically no frontal cone. Antennal scape clear ochreous, flagellum all black. *Thorax* ochreous or buff-coloured, practically unmarked, but as seen from behind (not from in front) the inner margins of the lateral praescutal stripes and a median line in the median stripe appear dark brownish. *Abdomen* with tergites 1–3 and sternites 1–5 brownish-ochreous, practically unmarked, tergites 4–6 with a median blackish line, 7–8 mainly blackish. *Legs* with coxae and trochanters ochreous; femora brownish with tips broadly blackened; tibiae blackish-brown, front and middle pairs entirely so, hind pair with a single dirty-white ring close to base; tarsi all dark brown, indistinctly lighter towards tips. *Wings* very much as in *T. pedata*, Wied., but narrower; axillary area narrower than in the female of *T. pedata*; ground-colour of wing mostly rather murky, including the whole anal cell; dark area in middle of cell *M* larger. Halteres with dark brown knob, stem paler.

Length of body, 21 mm.; wing, 20 mm.

Sikkim: Kurseong, 5000 ft., 18–30.iv.1922, 1 ♀ (*T. B. Fletcher*).

Only four other species of this subgenus have the white tibial rings reduced or absent. Of these, *T. fumifinis*, Walk. (Amboina), has the costal cell black; *T. albiprivata*, Edw. (Borneo), has no white ring even on the hind tibia, and quite different abdominal markings; *T. joana*, Alex. (Japan), has no dark area in middle of cell *M*; and *T. succinipennis*, Alex. (Philippines), has four praescutal stripes and yellow wings.

2. *T. scimitar*, Alex.

1922, *Tipulodina scimitar*, Alexander, Bull. Mus. Hist. nat. Paris, **1922** : 100.

Type a male from Rangoon. The British Museum possesses a male from this locality (coll. *F. J. Meggitt*) and a female from Myitkyina, Upper Burma (*T. B. Fletcher*).

T. scimitar is very closely related to the Javan *T. pedata*, Wied., which it resembles in having a broad white ring on each front and middle tibia, two such rings on each hind tibia, and the tarsi white except at the base. It differs from *T. pedata* in various details, such as the rather longer male antennae; the darker mesonotum, with distinct lateral praescutal stripes; the darker front femora, with a broad subapical yellowish ring; and the broader, almost spot-like infuscation over the cross-vein *m-cu*. The female noted above differs from the male (also from both sexes of *T. pedata*) in having the antennal flagellum yellowish with distinct black rings at the bases of the segments.

3. *T. patricia*, Brun.

1912, *Tipula patricia*, Brunetti, Fauna Brit. Ind., Dipt. Nem.: 313.

Type from Kurseong, Darjiling district; not represented in the British Museum collection.

This is evidently closely allied to *T. scimitar*, but differs in wing-markings, the central spot crossing both basal cells.

4. **Tipula (Tipulodina) barraudi,** sp. n.

Head dark greyish-brown, with a darker brown median line which ends anteriorly in a small sharp frontal cone; area around bases of antennae white; rostrum ochreous above, brown at sides. Antennae in ♂ longer than head and thorax together, scape ochreous, first segment not obviously darkened at tip, flagellum dark brown, the segments only very indistinctly paler apically. Antennae in ♀ scarcely as long as thorax, mainly ochreous, flagellar segments with their bases blackened. *Thorax* brownish, sides lighter; pronotum dark brown in middle; praescutum with three distinct dark brown stripes, the middle one with a black median line (equally distinct from in front or behind); scutellum and postnotum darkened in middle; pleurae heavily dusted with whitish-grey. *Abdomen* brownish-ochreous above, lighter beneath; first tergite mainly dark greyish-brown; tergites 2–5 with ill-defined, narrow, transverse subapical bands. Hypopygium of ♂ resembling that of *T. pedata*, the outer style being long, slender, simple, pointed, with the tip blackened; eighth sternite somewhat produced but without the prominent point of *T. pedata*. *Legs* with coxae ochreous, grey-dusted, unmarked; femora brownish with the tips blackened, front pair with a broad and very indistinct brownish-ochreous ring; tibiae blackish, each with a broad white subapical ring, leaving a rather broad black tip (on anterior legs about two-thirds, on hind legs from one-third to one-half as broad as the white area); hind tibiae with the usual white sub-basal ring; tarsi white, with basal third to half of all basitarsi black. *Wings* glassy, with a small brown spot crossing cell *M* before middle; stigma and a spot below it blackish; a broad dark brown seam on *m-cu* and distal portion of *Cu* but none on outer end of discal cell; a large brown spot at tip from costa to M_1, including small clear areas in cells R_3 and R_5; small dark clouds at tips of M_2, M_3 and (in ♀) M_4. Axillary area equally narrow in both sexes. Halteres with black knob and brown stem.

Length of body, 17–21 mm.; wing, 14–16 mm.

Assam: Nongpoh, vii.1922, 1 ♂, 1 ♀ (*P. J. Barraud*).

The wing of this species was figured by Brunetti (*Fauna Brit. Ind.*, Pl. V, fig. 5) as that of *T. venusta*, Walk., but Walker's species belongs to quite a different group, being nearly related to the sub-genotype (*T. magnicornis*, End.). The new species differs from *T. pedata* and other closely related species in the longer antennae, more glassy wings, and other details.

B. *venusta*-group.

5. *T. brunettiella*, Alex.

1918, *Tipula pedata*, (Wied.) Brunetti, Rec. Ind. Mus., **15** : 272.
1923, *Tipulodina brunettiella*, Alexander, Ann. Ent. Soc. Amer., **16** : 75.
1927, *Tipula* (*Tipulodina*) *brunettiella*, (Alex.) Edwards, Spolia Zeylan., **14** : 127.

Ceylon. Larvae in hollow bamboo stumps.

Differs from all the other known species except *T. fumifinis*, Walk. (of Amboina), in having the costal cell entirely black, and from *T. fumifinis* in the sharply-defined white tibial rings; the distal white ring of the hind tibia is much broader than the proximal one, but is well removed from the tip.

6. *T. ceylonica*, Edw.

1927, *Tipula* (*Tipulodina*) *ceylonica*, Edwards, Spolia Zeylan., **14** : 126.

Only known from two cotype females from an unrecorded locality in Ceylon.

Distinguished from other species of the group by having the wing-membrane largely brownish, especially in the anal cells, and the dark markings more extensive, the dark brown area at the tip filling the outer half of cell R_5 as well as of cell R_3.

7. *T. venusta*, Walk.

1848, *Tipula venusta*, Walker, List Dipt. Brit. Mus., **1** : 64.

In addition to Walker's type female from Sylhet, Assam, the British Museum possesses a female from Burma (*Mrs. Waring*, 1857) and a male from Rangoon, Burma (*Archibald*). The other records given by Brunetti are mostly, if not all, based on erroneous identifications.

This species has not been adequately distinguished hitherto, and its chief diagnostic features are therefore listed; it is evidently nearly allied to *T. magnicornis*, End. (Sumatra), differing in abdominal markings and the rather shorter male antennae.

Antennae in ♂ slightly longer than head and thorax together, in ♀ distinctly shorter than thorax; in both sexes rather conspicuously ringed, first segment pale yellowish, scarcely darkened towards tip. Vertex dark brown; a dark brown median stripe reaching forward to base of antennae and bordered by a wedge-shaped bluish-grey area on each side. *Thorax* with greyish-ochreous ground-colour; the three praescutal stripes dark brown and contiguous, median stripe with the usual blackish median line; scutellum mainly dark brown. Abdominal tergites extensively yellow at sides, but with large dark brown triangles on their posterior margins, apices of triangles reaching bases of segments; sternites all pale. Hypopygium of ♂ rather small, yellowish; eighth sternite not very prominent; lower style slender and upcurved but not very long, tip blackened, with a short tooth beneath at base of blackened portion. *Legs* blackish; white ring of front femur conspicuous, as are all the white tibial rings; those of front and middle tibiae and distal white ring of hind tibia well removed from the tip, the black terminal portion being quite four times as long as the tibial diameter; no pale ring on middle femur; tarsi largely white, basal half or more of basitarsi black, second segment of front and middle tarsi with a narrow blackish basal ring. *Wings* almost as figured by Enderlein for *T. magnicornis*, but dark area at wing-tip crossing cell R_5 and including two small clear areas on the margin, one in cell R_3 and one in cell R_5; dark seam over *m-cu* very slight in ♀, scarcely distinguishable in ♂.

Length of body, ♂ 19, ♀ 30 mm.; wing, ♂ 17, ♀ 22–24 mm.; antenna, ♂ 5·5 mm.

8. **Tipula (Tipulodina) sidapurensis,** sp. n.

♀. Allied to *T. venusta*, Walk., differing chiefly as follows :—*Head* with the median dark brown line narrower, the two grey patches relatively larger, but not reaching occiput. First antennal segment more distinctly darkened on distal half. Praescutal stripes distinctly separated by grey lines. Scutellum with a rather narrow dark median line. Abdomen with dark markings of tergites irregular in shape, not triangular; sternites 5–8 each with a blackish median line. Second segment of front and middle tarsi not darkened at base. *Wings* with dark mark at tip smaller, not extending into cell R_5; no trace of dark seams over branches of *M* or along *m-cu*.

Length of body, 19 mm.; wing, 15 mm.

Coorg : Sidapur, 8000 ft., 1.vi.1917; type ♀ presented to British Museum by Mr. T. Bainbrigge Fletcher (Indian collector).

The specimen was labelled by Brunetti as probably a new species near *T. simillima*, Brun.; it differs from that and other related forms (such as *T. cinctipes*, de Meij., and *T. aetherea*, de Meij.) in the much broader black tips of the tibiae and in other respects.

9. *T. simillima*, Brun.

1918, *Tipula simillima*, Brunetti, Rec. Ind. Mus., **15** : 265.

Recorded only from Castle Rock, N. Kanara, S.W. India; two males from this locality are in the British Museum.

T. simillima is related to *T. cinctipes*, de Meij. (Borneo and Malay Peninsula), which it resembles in having a distinct whitish subapical ring on the middle femur in addition to that on the front femur, and the distal white rings of the tibiae placed very close to the tip, leaving only a small black area which is not or scarcely wider than the tibial diameter; as in *T. cinctipes* the tarsi are largely white, but extensively blackened at the bases of the first two segments. The male hypopygium is very different from that of *T. cinctipes*, and the dark mark at the wing-tip is larger and more intense, reaching to vein M_1.

10. *T. contigua*, Brun.

1918, *Tipula contigua*, Brunetti, Rec. Ind. Mus., **15** : 265.

Recorded only from Garo Hills, Assam; unrepresented in British Museum.

According to the description this must bear a considerable resemblance to *T. venusta*, Walk., but the front and middle tarsi are entirely dark, and according to my notes on the type the distal white rings on the tibiae are very near the tip (presumably as in *T. simillima*, Brun.). Brunetti does not state whether white rings are present on the femora, and I failed to observe this point.

11. *T. gracillima*, Brun.

1912, *Tipula gracillima*, Brunetti, Fauna Brit. Ind., Dipt. Nem. : 302.

Described by Brunetti from a female from Peradeniya, Ceylon, and also recorded from South India. The British Museum possesses a female from Peradeniya, Ceylon (*J. C. F. Fryer*) and specimens of both sexes from Suduganga, Ceylon (*R. Senior-White*).

T. gracillima is a very delicately built species which resembles *T. simillima* and *T. cinctipes* in having a white subapical ring on the middle femur, but differs from these species as well as from all others of the subgenus known to me in venation, the vein R_2 being extremely short and not reaching the costa (sometimes absent), and R_3 running unusually near the costa and almost reaching the wing-tip; the sub-circular shape of the dark spot at the wing-tip is also distinctive. The male antennae are only slightly longer than those of the female, with much shorter verticils than in the other species; the hypopygium is small, with the eighth sternite remarkably produced and hairy at its tip.

OBSERVATIONS ON THE COCCIDAE OF SOUTHERN RHODESIA *

By W. J. Hall, D.Sc., F.E.S.

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Ceronema africana, Macfie. (Fig. 1.)

C. africana, Macfie, 1913, Bull. Ent. Res., **4** : 31.
C. acaciae, Hall, 1923, Min. Agric. Egypt Tech. Bull., **36** : 13.
C. africana, Hall, 1925, ,, ,, ,, **64** : 21.

On *Acacia* sp. (Leguminosae), Umtali, 2.xii.27, and *Ficus carica* (Moraceae), Umtali, 29.xii.31, coll. Dr. O. E. Jackson (ex coll. Dept. Agric. Salisbury, No. 2976).

This species was originally described from Northern Nigeria as attacking *Caesalpinia pulcherrima* (Leguminosae) and later recorded from Egypt on *Acacia arabica* var. *nilotica*.

A B C

Fig. 1.—*Ceronema africana*, Macfie, females with ovisacs. A, front view; B, side view; C, back view, × 1·8.

Rhodesian examples are certainly referable to this species, but they are considerably larger than Egyptian specimens or those described by Macfie. The ovisac in this case measures—length, 15–16 mm.; breadth, 11·5–12·5 mm.; height, 10–11 mm. The adult female prepared for microscopic examination measures—length, 10 mm.; breadth, 9 mm. These measurements are nearly double those given by Macfie.

The only other difference from the original description lies in the fact that the antennae are 8-segmented and not 9-segmented, but the characteristic short 2nd segment is present in both forms. In Egyptian material it was found that the antennae might be either 8- or 9-segmented (*l.c.*) so that too much stress cannot be laid on the number of the antennal segments.

* The first three parts of this series appeared in 1928, *Bull. Ent. Res.*, **19** : 271–292; 1929, *loc. cit.*, **20** : 345–358, 359–376; the fourth part appeared in 1931, *Trans. Ent. Soc. Lond.*, **79** : 285–303.

Macfie mentions the fact that a single larger spine—larger than the marginal spines—marks the stigmatic area. At the same time he figures it associated with two shorter spines of much the same length as, but different in form from, the marginal spines. The stigmatic spines are three in number, the median being three to four times as long as the laterals; the latter are somewhat variable but are usually much the same length as the marginal spines, they are blunted and not markedly swollen at the base, whereas the marginal spines are much swollen at the base and narrow sharply towards the tip. Egyptian material agrees with that from Rhodesia in the above points.

In all other respects Rhodesian material agrees perfectly with the original description and with slides made from Egyptian specimens in the writer's collection.

Morrison points out (1922, *Proc. U.S. Nat. Mus.*, **60**: 60) that *C. africana*, Macfie, differs in morphological characters from the type of the genus. Whilst this may be true, the affinities are such that it seems advisable to leave it where it is for the time being. When further species of this genus become known, it may be possible to group the various forms with greater precision.

Filippia oleae, Costa, var. **rhusae**, var. n. (Fig. 2.)

This variety differs from *oleae*, Costa, in the following details :—

1. The ovisac is much longer, though with the same smooth and closely matted surface.
Length of adult female, 3–3·75 mm.; *breadth*, 1·5–2·25 mm.
Length of ovisac, 6–8 mm.; *breadth*, 2–2·5 mm.

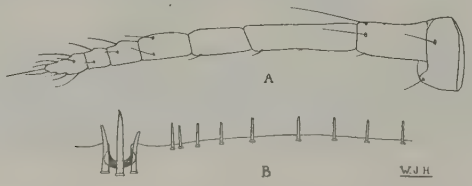


Fig. 2.—*Filippia oleae*, Costa, var. *rhusae*, var. n.: Adult ♀. A, antenna, × 75; B, stigmatic cleft and portion of margin, × 75.

2. Margin with a series of small, thin, bluntly-pointed spines about 25 μ in length and set at irregular intervals of an average distance of about 35 μ.

3. Stigmatic spines variable, three in number and uniformly stout; they may be either pointed or blunted at the tip. The longest is about 65 μ in length, the shortest 35 μ, whilst the third may be as long as the longest or as short as the shortest. The spines may be straight or curved, the median or longest is sharply pointed at the tip, whilst the laterals are usually somewhat blunted.

4. Stigmatic cleft lined with a distinct chitinous band.

5. Valves of the anal operculum with a long and stout apical seta—rather more than half the length of one of the valves—and a few shorter setae.

On *Rhus* sp. (Anacardiaceae), Embeza, 10.ix.27 and 30.xi.27.

It was at first thought that this species might be *F. chilianthi*, Brain, but the latter is said (1920, *Bull. Ent. Res.*, **11**: 265) to have truncate marginal spines and comparatively slender stigmatic spines.

The marginal spines of *F. oleae*, Costa, as described and figured by Leonardi (1920, *Cocc. Ital.*, p. 340) resemble those of the Rhodesian specimens, but a slide in the writer's collection of this species, ex coll. E. E. Green, made from specimens collected by Leonardi himself, show the marginal spines to be flattened in the apical half with an excavate apex. A long series of preparations has been made from Rhodesian material, and one specimen was found which had five spines of the flattened type described above. In view of this, it is considered that Rhodesian specimens should be regarded as a variety of *oleae*, Costa. The greater length of the ovisac, together with the nature of the anal valves, marginal setae and stigmatic spines should serve to distinguish it readily from *F. oleae*, Costa.

Pulvinaria aristolochiae, Newst.

Newstead, 1917, Bull. Ent. Res., **8** : 19.
Brain, 1920, Cocc. South Africa, V., Bull. Ent. Res., **11** : 260.

On *Chlorocodon* sp. (Asclepiadiaceae), Mazoe, 8.xi.27.

Rhodesian material is undoubtedly referable to this species in spite of a few differences of a minor nature. The principal difference lies in the antennae. Newstead shows segment II as being only one-quarter of the length of III; Brain indicates that, for South African specimens, it is between a half and a third, whereas in Rhodesian material segment II is, relatively, unusually long, being between two-thirds and three-quarters the length of III. It is also longer than segments IV and V in every case, though often very slightly. Segment V exhibits a tendency to divide; as a rule the articulation is not complete, but in two cases 9-segmented antennae were seen as a result of this further division, the 6th segment thus cut off is small. The long distal hair on the 3rd segment is also missing in all Rhodesian examples.

The stigmatic spines were broken away in all Newstead's specimens, and Brain makes no reference to them in recording the species from South Africa. There is always one long and stout stigmatic spine about twice the length of the marginal spines and correspondingly stouter which narrows rapidly at the apex to a sharp point. No other stigmatic spines are sufficiently differentiated to enable them to be picked out consistently in all specimens, but occasionally from one to three spines in the immediate vicinity are of a similar character to the stigmatic spine—not gradually tapering to a point as the marginal spines, but of much the same length as these. The marginal spines tend to be closer together in the vicinity of the stigmatic areas and more irregularly spaced.

Newstead refers to the submarginal pores as being " very large, continuous but rather widely separate." This is true of Rhodesian material which in addition exhibits pores of a similar nature elsewhere on the dermis. A series runs up on either side of the median line from just in front of the anal opercula to the line of insertion of the anterior pair of limbs, there being apparently 7 pores in each series. In addition there is a similar pore in the vicinity of both the anterior and posterior spiracles. Those in the median series appear to correspond in position to those of the submarginal series.

The size of the adult female immediately prior to oviposition, in Rhodesian examples, is about 8 mm. long and 4 mm. broad, *i.e.* much the same as quoted by Brain but larger than Newstead's specimens. The average length of the ovisac is 28–30 mm., which is also considerably longer than the figures quoted by Newstead.

The ovisac in Rhodesian examples is not generally tortuous as described by Newstead, but that is probably due to the food-plant—the species of *Chlorocodon*

on which the specimens were found was a climbing plant with very long, thin, straight stems. The surface of the ovisac exhibits obscure longitudinal striations, but although the sides are subparallel it is hardly closely felted.

There can be little doubt that the Rhodesian examples are referable to Newstead's species in spite of the minor differences to which reference has been made.

Pulvinaria cussoniae, sp. n. (Fig. 3.)

Adult female broadly ovate; green or yellowish-green in colour with two faint brown longitudinal stripes diverging from the anal operculum, which run parallel to the margin and finally unite in the neighbourhood of the anterior margin. In some specimens the green coloration is irregularly mottled with darker green or brown. Dead specimens turn brown.

At the time of oviposition the females are often so closely clustered that the true form of the ovisac is obscure. The ovisac is short, highly convex, and rather broader than the female. The white secretionary matter extends right round the margin as a distinct band.

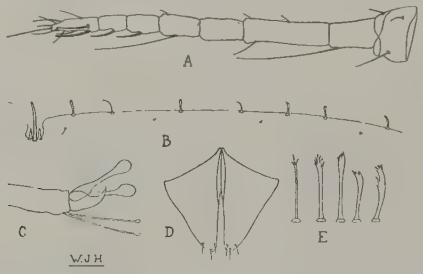


Fig. 3.—*Pulvinaria cussoniae*, sp. n.: Adult ♀. A, antenna, × 75; B, stigmatic cleft and portion of margin, × 75; C, foot, × *c.* 110; D, anal valves, × *c.* 60; E, marginal spines, × *c.* 300.

An adult female in the early stages of oviposition appears to be resting on a bed of white secretionary matter, but later this becomes prolonged posteriorly to form the ovisac, and the female is tilted forward on to its anterior margin; at the same time the abdominal segments become contracted and transversely wrinkled. The surface of the ovisac is not closely matted, but it carries obscure transverse striations and the fibres of which it is composed are very elastic.

Eggs very pale almost colourless.

Length of adult female, 2·0–3·0 mm.; *breadth*, 1·25–2·0 mm.

Length of female plus ovisac, 3·0–4·0 mm.; *breadth*, 2·0–2·5 mm.

Adult female with normally 8-segmented antennae of somewhat variable length in which the 3rd segment is much the longest; the 2nd and 8th are subequal and slightly more than half as long as the 3rd; the 4th and 5th are again subequal, slightly shorter than the 2nd and 8th, with the 4th in some individuals a little longer than the 5th; the 7th is the shortest segment with the 6th only very little longer. The arrangement of hairs and spines on the segments is normal; the 2nd and 5th each carry a very long seta. Some specimens show 7-segmented antennae, due to the fact that the 4th segment has not divided.

Legs well developed with tarsi about half as long as the tibiae; foot with four digitules, of which the unguals are stout and dilated at the extremity.

Margin set with short hairs at wide and somewhat irregular intervals; these vary from slender, simple setae to rather stout hairs which are swollen and frayed at the extremity,

the simple setae or those only faintly frayed at the apex are usually curved towards the posterior end of the body. The great majority of the setae are frayed to a greater or lesser degree; they are approximately 18–20 μ in length and set about 50 μ apart. Stigmatic cleft small but distinct with three stout spines, of which the median is much the longest. The median spine is from two and a half to three times as long as the laterals, and is rather stouter and more blunt. The laterals are pointed and markedly swollen at the base; they are usually shorter than the marginal setae, being about 12–15 μ in length. Four to six small submarginal tubercles are present.

Valves of the anal operculum with outer angle acute and apical angle rounded. Derm cells irregularly oval or circular, tending to be larger and more numerous in the vicinity of the margin. The dermis is studded with numerous minute tubular pores; larger multilocular pores occur around the anal operculum, and are sparsely distributed over the ventral dermis.

On *Cussonia arborea* (Araliaceae), Macheke, 3.xii.27, Greenwood Park, Salisbury, 6.ii.29 and 5.ii.28, ex coll. Dept. Agric. Salisbury; on (?) Victoria Falls, 3.viii.29, and on *Uapaca kirkiana* (Euphorbiaceae), Darwin, 30.vi.23, ex coll. Dept. Agric. Salisbury.

This species is relatively common on *Cussonia* in Rhodesia; it does not appear to agree with any other form previously described or recorded from Africa. The specimens collected at the Victoria Falls on an unknown plant were brown to dark brown, usually paler at the margin. The ovisac showed a median longitudinal groove, but otherwise the specimens were identical with those from *Cussonia*. The material on *Uapaca* was very scanty, consisting of very few adult females only two of which had ovisacs (damaged), but the characters agreed so closely with the abundant material from the other food-plants that there can be little doubt that they are correctly assigned to this species.

The specimen selected as " type " is so clear that the derm cells are hardly discernible.

Pulvinaria gymnosporiae, sp. n. (Fig. 4.)

Living specimens not seen. Dead individuals are brown, a faint tinge of green sometimes being discernible. The ovisac is apparently of average development; it is highly convex, slightly broader than the insect and about one and a half times to twice its length. The surface of the ovisac is not closely matted, and the adult female is very much tilted forward on to its anterior margin.

Adult female ovate with 8-segmented antennae, which are of an extremely variable nature. The 3rd segment is invariably the longest, with the 2nd segment usually the next longest and the 7th the shortest. The principal variation lies in the 6th segment which may be either short or long. In the series of preparations made half of the antennae fell into the one category and half into the other. In the short form it is very little longer than the 7th segment, which is the shortest; in the long form it is twice as long as the 7th and often very little shorter than the longest segment (3rd). In some instances both forms are represented in one individual.

Legs well developed with the tarsi rather less than half as long as the tibiae. Foot with four digitules of normal type, the unguals are stout and conspicuously knobbed at their extremities.

Margin set with short hairs at wide and somewhat irregular intervals; they vary from simple setae to stout hairs, which are swollen at the apex and have serrated tips. The great majority of the setae are thickened or dilated at the apex to a greater or less degree; the finer setae are curved in a posterior direction. The marginal setae are 18–22 μ in length and set about 40–45 μ apart. Stigmatic cleft shallow with three stout spines, of

which the median is about twice as long as the laterals; the latter are usually the same length as, or slightly longer than, the marginal setae. The three spines are stout and bluntly pointed. Seven to eleven submarginal tubercles present.

Valves of the anal operculum with the outer angle rounded. Derm cells more or less circular; these are larger and more numerous in the submarginal region. The dermis is

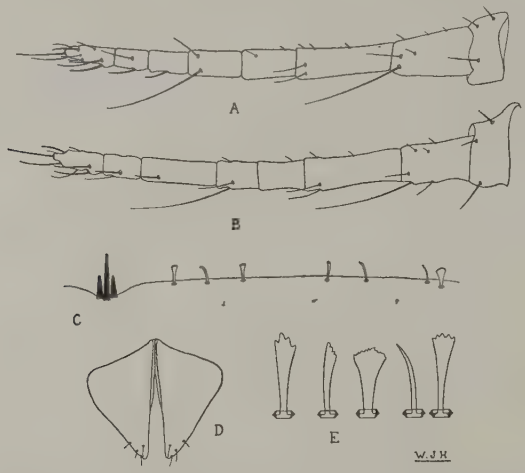


Fig. 4.—*Pulvinaria gymnosporiae*, sp. n.: Adult ♀. A, antenna with short 6th segment, × 75; B, antenna with long 6th segment, × 75; C, stigmatic cleft and portion of margin, × 75; D, anal valves, × *c.* 60; E, marginal spines, × *c.* 300.

studded with numerous minute tubular pores, larger multilocular pores occur around the anal operculum, and are sparsely distributed over the ventral dermis. *Length*, 4·0–4·5 mm.; *breadth*, 3·0–3·25 mm.

On *Gymnosporia* sp. (Celastraceae), Salisbury, 26.xi.17, ex coll. Dept. Agric. Salisbury.

This species is not unlike *cussoniae*, but it exhibits several small though constant differences both in the living state and under the microscope.

Pulvinaria lepida, Brain.

Brain, 1920, Cocc. South Africa, V., Bull. Ent. Res., **11** : 216.

On "Grass," Salisbury, 2.iii.28; Mazoe, 14.iii.29; River Makabusi, April 1927 (*F. Eyles*); Salisbury, 11.i.18 (ex coll. Dept. Agric. Salisbury); on *Cymbopogon giganteus* and *Andropogon schinzii*, Embeza, 12.iii.28; on *Heteropogon contortus*, Hillside, Salisbury (ex coll. Dept. Agric. Salisbury).

This species is not uncommon on various grasses in the vicinity of Salisbury. Rhodesian material would appear to be referable to Brain's species, but the individuals show such variation that it was thought at one time that at least two species were represented. The examination of a comparatively long series of preparations leads one to the conclusion that they are all one and the same, but that considerable variation occurs within the species.

Very young specimens are elongate, the length being about two and a half times the breadth. They are usually a pale, semitransparent brown with a longitudinal submarginal reddish stripe on either side.

Just prior to gestation the adult female is almost diamond-shaped; the posterior extremity is more rounded than the anterior. When oviposition commences the female gradually becomes tilted more and more forward on to its anterior margin, and the median portion becomes contracted, giving rise to a number of transverse wrinkles. The surface of the ovisac is not closely matted, and is usually traversed by more or less distinct longitudinal striations; it is composed of material which pulverises very readily and if stroked lightly with the finger goes into a very fine white powder. The colour of the adult female varies from a pale brown through dark brown to dark brownish-green, and just prior to oviposition is about twice as long as it is broad.

An examination of microscopic preparations confirms the view expressed by Brain that the antennae are extremely variable. They may be either 7- or 8-segmented; in the former the 4th is always the longest and the latter form is created by the division of this segment into a shorter basal half (4th) and a longer apical half (5th). In some specimens the length of the antennae is markedly shorter than in others, and in such cases the segments are usually relatively wider.

The marginal spines are as described by Brain; they are more or less constant in length, form and arrangement in all individuals. The stigmatic spines, however, show very considerable variation; the spine-groups in any one individual are usually comparable, but they vary very much from individual to individual even in the same collection. There are always three spines present as described by Brain, "laterals short, acute: median stouter, longer, blunt." In Rhodesian examples the average length of the marginal spines is 40 μ, the median stigmatic spine varies from 74 μ to 17 μ and the laterals from 34 μ to 7 μ. In cases where the median spine is long it is usually curved at the tip. Both median and laterals vary, also, very much in the degree of stoutness; generally speaking the laterals are acute and the medians blunt.

An additional feature worth noting is that the ungual digitules to the claw of the leg are relatively poorly developed; they are of normal length but very little stouter than the tarsal pair, which are of the usual type, and although the terminal swelling is rather greater than in the case of the tarsal pair it is relatively small.

Through the kindness of Mr. H. K. Munro of the Union of South Africa Department of Agriculture, Pretoria, four slides of *P. lepida* were lent for examination. The specimens represented on these slides showed some variation in the stigmatic spines, but not to quite the same degree as that found in Rhodesian material. There is no doubt that it is correctly assigned to *P. lepida*, a species which is of an extremely variable nature in certain respects.

Pulvinaria jacksoni, Newst.

P. jacksoni, Newstead, 1908, J. Econ. Biol., **1**: 155.
,, Brain, 1920, Cocc. South Africa, V., Bull. Ent. Res., **11**: 261.

On *Croton silvaticus* (Euphorbiaceae), Municipal Gardens, Salisbury, 14.xi.27, and Salisbury, 6.vi.29.

This species was common in June 1929 on the Crotons bordering certain of the streets in Salisbury.

Rhodesian material agrees reasonably well with Newstead's original

description of *jacksoni*. Such differences as there are may be summarised as follows :—

P. jacksoni, Newst.	Rhodesian material.
Ovisac closely felted and web-like in texture.	Ovisac not closely felted.
Long seta on 3rd antennal segment.	Long seta on 2nd antennal segment.
Antennal segments 5–8 subequal.	Antennal segment 5 usually longer than 6, 7 or 8 (Brain indicates the same for South African material).
With pointed stigmatic spines—number unstated.	With 5–7 stigmatic spines.
Two large tubercles associated with the stigmatic clefts. Later Newstead stated (1911, *Bull. Ent. Res.*, **2** : 93,) that these were wanting in some material received from Uganda.	No tubercles associated with the stigmatic clefts.

There would appear to be a close affinity between the African *jacksoni* of Newstead and the Indian *maxima* of Green. The principal difference between the two species lies in the size and number of the dorsal dermal cells, which are large, crowded and more or less contiguous in *maxima* but relatively small and widely spaced in *jacksoni*. The antennae and limbs also tend to be relatively shorter and stouter in *jacksoni*.

The actual number of the stigmatic spines in *maxima* is not very clear. Green states (1904, *Ent. Mon. Mag.*, **40** : 206), " Margin with a close fringe of stout spines which, in all my examples, are irregularly truncate, as if broken, except at the stigmatic clefts where they are longer and sharply pointed." Ramakrishna Ayyar writes of this species (1925, *Mem. Dept. Agric. India* (*Ent.*), **8**, (12) : 136), " The marginal bristles are generally broken off during preparation and, except for a few isolated ones which remain entire, most of them show only their basal chitinous ring which gives rise to each spine. At the stigmatic cleft there are three such big rings indicating the presence of three specially strong spines at that region when the insect is alive."

In Rhodesian examples of *jacksoni* the number of stigmatic spines varies from 5 to 7; these range from one and a quarter to twice the length of the marginal spines. The two or three longest are usually relatively stouter than the shorter spines, and, when the spines are broken away, it is only the former that can be definitely recognised from the nature of their basal attachments. It seems not improbable that, in a perfect Indian specimen of *maxima*, more than three stigmatic spines might be found; these spines are not truncate, and thus, when present, can readily be distinguished from the truncate marginal spines.

A specimen of *P. maxima*, Green, ex coll. E. E. Green on *Jatropha curcas* (Euphorbiaceae), from India in the writer's collection has all the stigmatic spines broken away, but from a study of the basal attachments it is quite conceivable that more than three were originally present.

P. jacksoni has been recorded from the Gold Coast, S. Nigeria, Uganda, Kenya, Nyasaland and the Union of South Africa. Cotton is one of its common food-plants and it is worthy of note that *P. maxima* attacks this crop in India. In the Union *P. jacksoni* was collected on *Trichilia* sp. (Meliaceae), a plant of the same family as *Azadirachta indica*, the principal host of *maxima* in India.

Rhodesian examples were found on *Croton silvaticus* (Euphorbiaceae), and *maxima* is recorded as attacking *Acalypha bicolor* and *Jatropha curcas* in India, both of which belong to the same botanical family.

The evidence available to the writer indicates that *maxima*, Green, and *jacksoni*, Newst., are probably racial forms of one species, but for the time being it seems advisable to retain their existing names.

Pulvinaria mesembrianthemi, Vall.

Vallot, 1830, Bull. de Ferussac., **22** : 469.
Leonardi, 1920, Mon. Cocc. Ital. : 337.
Brain, 1920, Cocc. South Africa, V., Bull. Ent. Res., **11** : 262.

On *Mesembrianthemum* sp. (Aizoaceae), Avondale, Salisbury, ex. coll. Dept. Agric. Salisbury, No. 1135.

Rhodesian examples are typical of this widely distributed species. According to Brain (*l.c.*) it is common on *Mesembrianthemum* throughout the Union of South Africa.

Pulvinaria psidii, Mask.

Maskell, 1892, Trans. N.Z. Inst., **25** : 223.
Green, 1909, Coccidae of Ceylon : 264.
Brain, 1920, Cocc. South Africa, V., Bull. Ent. Res., **11** : 263.

On coffee, Vumba near Umtali, April 1929, coll. A. Cuthbertson.

This material was very badly damaged, and it was impossible to make out the characters of the ovisac. Under the microscope the specimens agreed very well with the description of *psidii* and with authentic specimens of this species in the writer's collection.

Pulvinaria randiae, sp. n. (Fig. 5.)

Adult female broadly oval, very dark brownish-green almost black in colour. Dermis with a rather obscure median longitudinal carina which has little rugosities at more or less

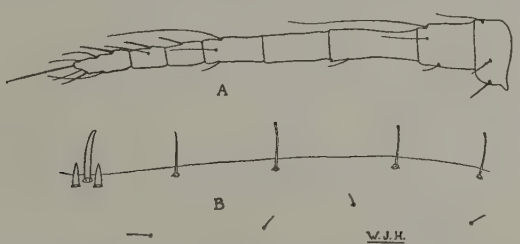


Fig. 5.—*Pulvinaria randiae*, sp. n. : Adult ♀. A, antenna, × 75; B, stigmatic cleft and portion of margin, × 75.

regular intervals along it. Dermis with a few similar rugosities irregularly spaced. Margin inclined to be somewhat upturned in older specimens. Ovisac broad, rather broader than the female, transversely striated and with usually a marked median longitudinal groove and a few obscure longitudinal striations. Surface of ovisac not closely matted.

Length of adult female, 4–5 mm.; *breadth*, 3–4 mm.

Length of adult female plus ovisac, 6–7 mm.; *breadth* of ovisac 3·5–4·5 mm.

Adult female with 8-segmented antennae of which the 3rd is the longest with the 4th next longest. The 2nd, 5th and 8th are subequal and somewhat shorter than the 4th, whilst the 1st, 6th and 7th are subequal and the shortest. The 2nd and 5th each carry a very long and slender seta.

Legs well developed with tarsi nearly two-thirds the length of the tibiae. Foot with four digitules, of which the ungual pair are stout and markedly dilated at their apices.

Margin set at wide intervals with a series of relatively long hairs which are very slightly frayed at the apex; they are about 45 μ long and on the average 100 μ apart.

Stigmatic clefts inconspicuous with three stout spines, of which the median is about twice the length of the laterals. The median spine is stout, blunt and usually slightly longer than the marginal setae; the laterals are sharply pointed and generally somewhat broader at the base than the median spine.

Valves of the anal operculum of normal form. Dermal cells medium to large in size and crowded. The dermis is studded with numerous minute pores; larger multilocular pores occur around the anal operculum and are sparsely distributed over the ventral dermis.

On *Randia vestita* (Rubiaceae), Inyazura, 29.xi.27.

This species, like *P. vangueriae*, comes close to *P. psidii*, Mask., and *P. africana*, Newst.; they differ in both cases from *psidii* and *africana* in the nature of the marginal setae. In *randiae* the marginal setae are longer and very much more widely separate than in *vangueriae*.

The specimen selected as "type" is very clear and the dermal cells are hardly discernible.

Pulvinaria vangueriae, sp. n. (Fig. 6.)

Adult female very dark brownish-green, usually a pale yellow-green round the margin. Ovisac highly convex with, in most cases, a more or less well-developed median longitudinal striation and others of a more obscure nature transversely.

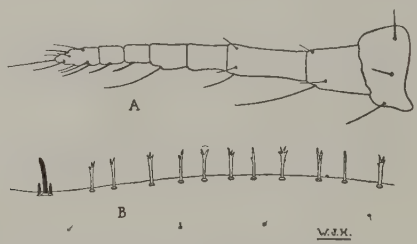


Fig. 6.—*Pulvinaria vangueriae*, sp. n.: Adult ♀. A, antenna, × 75; B, stigmatic cleft and portion of margin, × 75.

Eggs with a very faint tinge of green; young specimens green with a median longitudinal carina. All stages have a little crystalline matter scattered at intervals over the dermis. The margin is always markedly paler than the rest of the dermis.

Length of adult female just prior to oviposition, 2·5 mm.; *breadth* 1·8 mm.

Length of fully developed ovisac, 4 mm.; *breadth*, 2·25 mm.

Adult female ovate to broadly ovate with 8-segmented antennae of which the 3rd is the longest followed by the 2nd; the 1st and 8th are subequal and next longest, whilst the 4th is very slightly longer than the 5th, but shorter than the 8th; the 6th and 7th are subequal and the shortest.

Legs well developed but inclined to be relatively short and stout. Tarsi rather less than half the length of the tibiae. Foot with four digitules, of which the ungual pair are very stout and conspicuously dilated at their apices.

Margin closely set with hairs which are not markedly dilated at the apex but usually deeply forked two or three times. They are 30–32 μ long and set apart on the average by a distance equal to their length.

Stigmatic cleft inconspicuous with three stout bluntly-pointed spines of which the median is about twice as long as the laterals and relatively stouter and more blunt. The laterals are slightly less than half the length of the marginal setae, and the median spine is generally a little longer. The lateral setae vary considerably in length, but they are always markedly shorter than the marginal setae. Submarginal tubercles apparently absent.

Valves of the anal operculum of normal form with outer and apical angles rounded. Derm cells large, oval or circular in outline and approximate; close to the margin they are smaller and very much fewer. The dermis is studded with numerous minute tubular pores; larger multilocular pores occur around the anal operculum and are sparsely distributed over the ventral dermis.

On *Ficus* sp. (Moraceae), Mazoe, 7.xi.28, and *Vangueria* sp. (Rubiaceae), Mazoe, 8.xii.26, ex coll. Dept. Agric. Salisbury, No. 1448.

This species bears a close resemblance to *P. psidii*, Mask., and might easily be considered a varietal form were it not that the marginal spines are very different from those figured by Green in his Coccidae of Ceylon and in authentic examples of *psidii* in the writer's collection. The legs, also, are shorter and stouter than in *psidii*.

Hemilecanium imbricans, Green.

H. imbricans, Green, 1903, Ind. Mus. Notes, **5** : 94.
H. theobromae, Newstead, 1908, J. Econ. Biol., **3** : 39.
H. imbricans, Green, 1910, J. Econ. Biol., **5** : 6.
H. theobromae, Brain, 1920, Cocc. South Africa, V., Bull. Ent. Res., **11** : 256.
H. imbricans, Ayyar, 1929, Contribution to the Knowledge of South Indian Coccidae, Agric. Res. Inst. Pusa., Bull. **197** : 50.

On *Cedrela toona* (Meliaceae), Mazoe, 7.xi.28, and *Poinsettia* sp. (Euphorbiaceae), Que Que, 14.i.26, ex coll. Dept. Agric. Salisbury, No. 1344.

A heavy infestation of this species was found on a *Cedrella* tree immediately outside the writer's laboratory at Mazoe. It has been compared with specimens labelled *theobromae*, Newst., from the collections of the Union of South Africa Department of Agriculture at Pretoria and with a slide of *imbricans*, Green, on *Jatropha* from Coimbatore, India. Rhodesian material agrees with the specimens from both countries. *H. imbricans*, Green, has also been recorded as attacking *Cedrela toona* in Southern Mysore, S. India (1917, Newstead, *Bull. Ent. Res.*, **8** : 130).

THE CHARACTERS OF *ACRAEA STENOBEA*, WALLGR., AND *A. LYGUS*, DRUCE (LEP. NYMPHALIDAE)

By G. D. Hale Carpenter, M.B.E., D.M., F.E.S.

Some examples of an *Acraea* taken by the writer in Ngamiland in 1929–30 show that these two species have been confused in the past. Dr. H. Eltringham, F.R.S., in his monograph of the genus * treated *A. lygus*, Druce, as a synonym of *A. stenobea*, Wallgr. He has, however, been good enough to examine the male armature of the specimens in question, and finds it to be quite distinct from that figured in his monograph, which is that of the true *A. lygus*. *A. albomaculata*, Weym., thus becomes a variety of *A. lygus* and not of *A. stenobea*, and is distinguished by the presence of more white on the wing.

The following table summarises the differences between the two species.

	A. stenobea.	*A. lygus.*
Front-wing.	1. Discal row of spots consists of four.	Three or fewer spots; that in area 10 absent.
	2. Tendency to pale area outside discal row.	No such pale area.
	3. Basal black nearly reaching end of cell.	Not reaching beyond middle of cell.
	4. Apical black border not more than 1½ mm. broad.	May be 2 mm. broad.
Hind-wing.	5. On upper surface black border not quite 3 mm. wide in female, slightly narrower in male.	May be 5½ mm. wide in female and 3 mm. in male.
	6. On under surface black border is bordered with whitish on inner side.	No white border internal to the black.
	7. On under surface marginal spots occupy two-thirds of the depth of the black border, and are strongly tinted with yellow in the female.	Marginal spots smaller, not occupying more than half the depth of the black border. White.
	8. Spots on under surface nearer base tend to be white-ringed, especially in area 1c and cell.	Spots not white-ringed.
	9. Fringe white.	Fringe dark.
	10. Posterior part of abdomen in male creamy white.	Ochraceous orange.

As regards the male genitalia, the figure given by Eltringham in his monograph,† really representing *lygus*, should be compared with the figure accompanying this paper, representing *stenobea*, now shown for the first time. *Stenobea* differs mainly in the strong development of teeth on the inner side of the claspers, and in this respect it is nearer to *A. caecilia*, F., and *A. caldarena*, Hew., than to *lygus*. It agrees also with these in the relatively great length of the undivided basal piece of the claspers, which is about half the length of the complete organ, whereas in *lygus* it is only one quarter of the whole. Agreement with *caldarena* is again shown by the central articulating surface for the uncus between the bases of the claspers, which in *stenobea* is rounded as in *cal-*

* 1912, *Trans. Ent. Soc. Lond.*, **1912** : 190. † *Loc. cit.*, Pl. X, fig. 15.

darena, whereas it is deeply notched in *lygus* and slightly in *caecilia*. The uncus itself in *stenobea* is very much longer than in *lygus*.

There is also some difference in the distribution of these two species. *A. lygus* extends from Taru in Kenya and on the W. coast from Loango in the French Congo north of the mouth of the Congo, more or less continuously

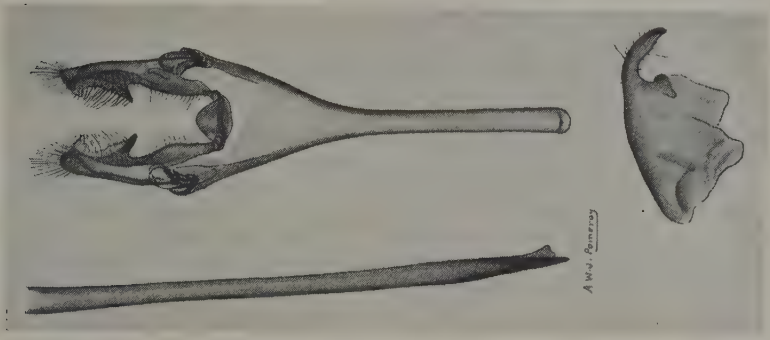


Fig. 1.—Male genital armature of *Acraea stenobea*, Wallgr.

southwards to the level of the Zambezi. Its extension further south, to King William's Town, is marked by a chain of localities running due south from Barotseland, through Buluwayo, Pretoria, and Maseru in Basutoland.

On the other hand, *A. stenobea*, while overlapping *A. lygus* in S. Rhodesia, does not seem to occur north of the Zambezi, although it is more widely spread through South Africa and seems alone to occur in S.W. Africa.

SOME NEW SPECIES OF THE DIPTEROUS FAMILY TACHINIDAE

By John R. Malloch.

Subfamily Tachininae.

Genus *Servillia*, Robineau-Desvoidy.

Servillia atra, sp. n.

♂. Head black, face testaceous, with dense yellow dust obscuring the surface, parafacials testaceous yellow, genae fuscous, both almost obscured with the dense yellow dust, frons fuscous, the interfrontalia reddish-brown in front, the orbits rather densely greyish-brown dusted, the dark colour descending on parafacials to near level of middle of second antennal segment; antennae black, second segment either entirely orange-yellow or of that colour at apex, the third segment narrowly reddish at base; aristae black; palpi orange-yellow; apical section of proboscis black. Thorax and abdomen deep black, postalar callositics, scutellum except base, and usually a stripe along each side of abdomen at lateral curve from base to beyond middle, brownish-yellow. All the fine hairs on head, thorax, and abdomen black, except those on occiput which are pale yellow. Mesonotum with faint even brownish dust, not noticeably vittate, abdomen without any trace of dusting on dorsum. Legs black, tibiae and tarsi orange-yellow, fore coxae with a few yellow hairs at apices. Wings slightly and evenly smoky. Calyptrae and halteres fuscous.

Frons at vertex about one-fifth of the head width, much widened to anterior margin, the inner marginal bristles on orbits well developed, diverging below and nearly attaining eye-margin at lower extremity; outer verticals shorter than inner pair, ocellars well developed; parafacials with fine dark hairs on entire extent; gena over half as high as eye; vibrissa long, well above epistome; second segment of arista not less than four times as long as thick; third antennal segment about two-thirds as long as second, widened from base to apex, the upper outline convex, the apex truncate. Mesonotum with 3 + 4 dorso-centrals, two pairs of presutural acrostichals, and four bristles on sublateral presutural area, the postsutural intra-alars two, prealar long, sternopleurals 1 + 1; scutellum with only four true marginal bristles, the apical pair minute or undeveloped, the apical half or more of the disc with numerous strong, closely placed, erect black bristles. Abdomen broadly ovate, fourth visible tergite with a noticeable central depression in apex, first tergite with eight or more central apical macrochaetae, the central bristles more widely separated than the others, the next two tergites each with a complete apical series of macrochaetae, the fourth with the apical series more dense but not as strong as the submedian series of macrochaetae; second to fourth visible sternites each with strong macrochaetae which are usually in two transverse series; fifth sternite with the processes rather short and almost evenly rounded at apices, without strong bristles; hypopygium without strong bristles, quite densely fine haired. Legs normal, the antero-dorsal surface of the fore tibia with a complete series of short bristles, mid tibia with a submedian ventral bristle. Wings normal, fourth vein much incurved just beyond the preapical angle. *Length*, 12–18 mm.

Type, Java, Tjibodas, 1500 m., August 1921; two paratypes, same locality, 1400 m., same date (*Karny*).

The darkest species known to me, distinguished by the dark-haired pleura, and lack of dusted fasciae on the abdomen, etc.

Servillia brevipennis, Walk. (redescription).*

♂, ♀. Head testaceous, the pale parts with rather dense yellow dust, upper half or more of back of head fuscous and slightly shining, frons black, interfrontalia dull, orbits glossy black, with slight dusting anteriorly, the black colour descending to lower edge of antennal insertion; antennae black, extreme apex of second and base of third segment reddish; palpi testaceous-yellow; apical section of the proboscis brownish-black; hairs on frons black, most of those on parafacials and genae also dark, occipital hairs pale yellow. Thorax fuscous, wth variable amounts of yellow, most noticeable on humeral angles, along lateral and posterior margins behind the suture, on the sutures of the pleura, and more noticeably on upper margin of the sternopleura; scutellum entirely semipellucid yellow; hairs mainly black on disc of mesonotum, the other hairs, including all those on pleura, yellow; mesonotum yellowish-grey dusted, with four narrow black vittae, the submedian pair discontinued a little behind suture, the outer pair not continued to posterior margin. Abdomen semi-pellucid testaceous-yellow, with a broad black or blackish-brown band across the apical half or more of the first three visible tergites and a similar band across the fourth which does not always attain the apex, the second, third and fourth tergites each with a densely yellow dusted basal fascia which is sharply margined on posterior edge and occupies about one-third or less of the exposed area of each tergite; the hairs of the same colour as the integument upon which they are situated except on the fourth tergite where they are black on the disc and become yellow on sides and venter. Legs black, usually entirely so in male, occasionally in male and always in female with the fore coxae yellow in front, all

* Before submitting this paper for publication, Mr. Malloch asked me to examine the types of Walker's species, which have been placed under *Servillia* in the British Museum Collection. As a result of this examination, I find that one of Mr. Malloch's proposed new species is identical with *S. brevipennis*, Walk. Walker's type is a unique male collected in Malaya. It is extremely valuable to have a redescription of the ♂ and a description of the ♀ from specimens in good condition.—D. Aubertin, 7.iii.32.

femora yellow with black apices, the fore pair largely infuscated above in male, hind tibiae sometimes brownish in female. Wings brownish-hyaline, the male usually with a quite noticeable brown cloud over costa which fills most of the subcostal cell and extends backwards into the two or three cells behind it, and a clouding along the course of some of the other veins including the two cross-veins. Calyptrae yellowish-hyaline. Halteres yellow.

♂. Frons at vertex about one-third of the head width, inner verticals longer than the outer pair, ocellars short; each orbit with opposite ocelli a single moderately strong bristle which is outwardly curved at tip, the orbits fully as wide as the interfrontalia at anterior extremity of ocellar triangle, the interfrontalia becoming wider below, each orbit with seven or more rather widely spaced inner marginal bristles which diverge but little below, terminating at end of the dark area, the lateral hairs numerous and quite long, the parafacials rather densely haired; antennae extending to lower level of eye, third segment fully as long as second, slightly and gradually widened to apex, the upper apical angle rather sharp, the lower one rounded, the arista inserted about two-fifths from base, second aristal segment about four times as long as thick; otherwise much as in preceding species. Thorax with the presutural acrostichals usually three pairs, the posterior pair close to suture, the sternopleura with almost invariably but one bristle; scutellum with six marginal bristles, the apical pair shorter than the others and cruciate, the disc with numerous erect black, and laterally some rather more decumbent yellow hairs, without any well-developed bristles. Abdomen narrowly ovate, almost cylindrical, with the usual strong apical central bristles on first visible tergite, four or more apical central bristles on second, and a complete apical series on third tergite, the second and third with a pair of additional discal bristles which are not found in any other species known to me; fourth tergite with the apical bristles rather dense and not as strong as the two transverse series in front of them, the anterior one of the latter proximad of the middle; sternites 2 to 4 each usually with but two strong apical bristles. Legs normal, mid tibia with a quite strong submedian ventral bristle. Bend of fourth vein more sharply angulate than in *atra*.

♀. Similar to the male, the frons hardly wider, but with two proclinate outer bristles on each orbit, the antennae more slender, with the third segment a little longer than second and the fore tarsi almost equally though not conspicuously widened from near base of basal segment to near apex of fifth. *Length*, 13–15 mm.

Redescribed from 23 specimens : 8, Selangor, Bukit Kutu; 11, Kedah Peak, Malay Peninsula, 3500 feet; 2, Fraser's Hill, one male with bicoloured femora, 4200 feet; 1, Cameron's Highlands, Pahang, 5200 feet, and 1 Kuala Lumpur, Selangor, F.M.S. (*H. M. Pendlebury*). F.M.S. Museums.

The colour difference in the legs of the sexes of this species is unique in the genus as far as I know, and it is remarkable that one male reproduces the bicoloured femora of the typical females almost exactly. The entirely pale yellow-coloured hairs and bristles on the fore coxae are not changed in the dark-legged males and the very striking glossy black frontal orbits are quite distinctive for the species.

Servillia javana, sp. n.

♂. A much smaller and less distinctively coloured species than either of the two preceding, but undoubtedly belonging to this genus because of the haired pro-pleura, bare prosternum, haired parafacials, structure of antennae, presence of palpi, and hind-marginal macrochaetae on the first visible abdominal tergite.

Head testaceous, with dense yellowish-grey dust, frons black, the interfrontalia more reddish, the black colour descending on parafacials to below middle of eye; antennae black; palpi testaceous; hairs on frons and parafacials black, on genae and back of head pale yellow, frontal orbits slightly shining and with faint greyish dust. Thorax black, mesonotum grey dusted and with four blackish vittae, the hairs on disc of mesonotum mixed black and yellow, those on pleura yellow; scutellum testaceous-yellow, the hairs and bristles black

except a few short hairs on each side at anterior lateral angles. Abdomen orange-yellow, semipellucid, first visible tergite black except on posterior margin laterally, second, third, and fourth each with a central black subquadrate mark which is smallest on fourth, and a black mark on each extreme lateral edge against the sternites, all sternites black; hairs almost entirely black on dorsum, becoming yellow on sides, and all yellow below, second, third and fourth tergites each with a narrow basal fascia of yellow dust which is not very sharply limited behind. Legs, including the coxae, fuscous, all tibiae and the hind tarsi brownish-yellow; fore coxae and all femora with mixed yellow and dark hairs and bristles. Wings brownish-hyaline, veins brown. Calyptrae and halteres yellow.

Frons at vertex about one-fifth of the head width, inner verticals very long, the outer pair short, ocellars hardly distinguishable; frontal orbits wider than interfrontalia above, the latter widened below, inner marginal bristles on orbits fine, and not divergent below, the hairs laterad of them long; epistome more produced than in the preceding species, extending well beyond frons in profile; antenna with the third segment a little shorter than second, widened from base to near apex, the latter broadly and quite evenly rounded; arista with the second segment four times as long as thick; palpi very slender, longer than entire antenna; apical section of proboscis quite slender, fully as long as height of head. Thorax with two or three pairs of fine presutural acrostichal bristles, the posterior pair close to suture; sternopleurals 1 + 1; scutellum with six marginal bristles, the apical pair short, and the basal pair almost indistinguishable, the disc without well-developed bristles. Abdomen short ovate, first visible tergite and second also with four central apical bristles, third with a complete apical series, fourth with a central series and the apical one rather dense though not strong; second, third, and fourth sternites each with two or four black bristles at apex; superior hypopygial forceps with a short beak-like apical process. Legs normal, the hind femur with the usual long submedian antero-ventral and postero-ventral bristle in addition to the other bristles. Fourth wing-vein almost angularly bent inward just beyond the preapical angle. *Length*, 10 mm.

Type, Netherland East Indies, Pangrango, May, 1921; paratype, lacking apices of third segment of antennae, "Gedeh," no other data. Sent to me by Dr. Karny some years ago.

It is entirely probable that other systematists placing a stricter interpretation upon genera in this section would refuse to accept this species as a *Servillia*, but the whole of the characters that I consider as criteria for the recognition of the genus are found in this species, even the fourth tergite having the numerous erect fine hairs that are generally accepted as diagnostic in comparison with *Tachina* (= *Echinomyia*).

The small size, colour of the abdomen and legs, and the two sternopleurals distinguish this species from any other known to me.

Servillia (Servillina) vespiformis, sp. n.

♀. Head brownish-yellow, densely covered with golden-yellow dust, the hairs bright fulvous, the bristles on the vertex and the inner margins of the frontal orbits black; antennae reddish-brown, third segment becoming darker towards apex; aristae fulvous at bases, darker apically; palpi orange-yellow; apical section of the proboscis black; vibrissae and some of the lower marginal bristles on genae black. Thorax fulvous, disc of mesonotum broadly black, obscured by greyish dusting and the dense, short, erect fulvous hairs; pleura with black marks on sternopleura, mesopleura, and hypopleura, the postscutellum and postnotum black; hairs on the pleura bright fulvous, the bristles mostly black; scutellum fulvous, hairs concolorous, the bristles on margin black. Abdomen shining black, with a fulvous mark along the lateral curve over apex of first, all of second, and the anterior angle of third tergite, the first visible tergite almost entirely fulvous haired, second with a rather broad basal fascia of fulvous hairs which widens out at the lateral curve

to cover its entire length, the third with a similar but much narrower basal fascia that also widens out at the curve, but the pale hairs do not extend over the entire ventral surface of the tergite as they do on the second, fourth with a few fulvous hairs at curve on anterior margin, the other hairs deep black and very dense, especially on the fourth tergite, the bristles short but stout, two on apical central part of first and two on second tergite, a complete but widely spaced apical series on third, and the usual discal and preapical series on fourth; sternites black. Legs fulvous, tarsi slightly darkened apically. Wings bright orange-yellow or fulvous at bases and along costa to midway between apices of first and second veins, with a large wedge-shaped dark brown or fuscous apical mark which covers the entire apex and ends in the form of a rather sharp point in first posterior cell close to inner cross-vein. Calyptrae and halteres fulvous yellow.

Frons at vertex about three-sevenths of the head width, inner verticals long, outer pair about one-third of their length, ocellars lacking, no proclinate orbitals present, each orbit with about eight fine inner marginal bristles, very slightly divergent below at bases of antennae; face straight in profile, slightly convex in centre vertically but not carinate, vibrissae close to epistome, the latter not at all produced; antennae elongate, extending almost to epistome, third segment about two-thirds as long as second, its width greatest near middle where it is less than half as wide as long, the apex rounded, and a short fine hair just above insertion of the arista, the latter inserted at about one-fifth from base of segment, its second segment hardly longer than thick; second antennal segment about six times as long as its width at apex; parafacials entirely haired; palpi and proboscis shorter than in any of the preceding species but still well developed. Mesonotum with 2 + 4 dorso-centrals, the presutural two in each series very widely spaced, two pairs of presutural acrostichals, the posterior pair close to the suture, and four bristles on the presutural sublateral area; sternopleurals 1 + 1; scutellum with six marginal bristles. Abdomen subcylindrical, with the hairs very short, dense, and depressed, the bristles as noted in preceding paragraph, the sternites each with two or four apical bristles. Legs normal, fore and mid tarsi widened, the fore pair most noticeably so. Venation normal. *Length*, 13·5 mm.

Type, Malaya, Cameron's Highlands, 19⅓ mile, 31.v.1931 (*H. T. Pagden*). F.M.S. Museums. To be deposited in the British Museum.

A very striking species that without doubt would be removed from this genus by some specialists on the family on the grounds that there are no proclinate frontal bristles and no ocellars. The head is also more definitely vertical in profile, but I do not care to give to these characters the weight that some of my contemporaries do, and therefore retain the species in *Servillia*.

No other species known to me has the peculiar colour markings of the wing and abdomen so conspicuous in the present species, and these characters ought to distinguish it at once from any previously known.

I believe I may be entitled to consider the species entitled to subgeneric separation from *Servillia* on the basis of the cephalic characters listed above and now propose for its reception the new subgenus **Servillina.** The male is unknown to me, and in that sex the proclinate orbital bristles are normally lacking so that the most obvious character for its distinction from *Servillia* in the restricted sense will then be the more nearly vertical face with the much lower-placed vibrissae. It is not at all likely that the microscopic hair near the base of the arista on third antennal segment will be found to occur invariably in the species, and the extremely widely spaced presutural dorso-central bristles appears to me to be an abnormal occurrence, though I may be in error in both cases.

Servillia alticola, sp. n.

♂, ♀. Closely related to *sumatrensis*, Townsend, from which it is distinguished mainly by the lack of strong bristles on the apical half of the scutellum. Head black, face and

anterior half of genae testaceous, all with yellowish-grey dust; second antennal segment red, third and aristae black, palpi fulvous red; parafacial hairs mixed dark and pale. Thorax black, densely brownish-grey dusted, no conspicuous mesonotal vittae; scutellum red; pleural hairs mostly pale, some black hairs on upper part of mesopleura. Abdomen red, with a large black central mark on all tergites, smallest on fourth, the sternites and adjoining edges of tergites dark, fine hairs on abdomen yellow below and in front on tergites, dark on apical central part of tergites 1 to 3. Legs reddish-yellow, femora except apices, and coxae, black. Wings brownish-hyaline. Calyptrae and halteres brown.

Parafacial hairs long, the fronto-orbital hairs and bristles longer and finer than in *sumatrensis*, the long fine outwardly curved bristle on each orbit near the level of the ocelli not distinguishable in *alticola* though evident in the other species in the male; third antennal segment with a more decided lobe on the under apical angle than in the older species. Mesonotum with the bristles much less distinctly differentiated from the hairs than in *sumatrensis*, and without well-developed apical discal bristles on the scutellum, the latter in *sumatrensis* very noticeably bristled on disc, many of the bristles as strong as the marginals; sternopleurals 1 + 1. Abdomen with the usual apical central bristles on first visible tergite generally in two groups of four each and also that number on second, the third with a complete apical series. Fore coxa either with all the hairs and bristles yellow or with at most one dark brown bristle amongst the others; in *sumatrensis* there are always several black bristles amongst the pale hairs. *Length*, 14–15 mm.

Type male, allotype, and 3 paratypes, B.N. Borneo, Pakka, Mt. Kinabalu, 10,000 feet, 25.iii.1929 (*H. M. Pendlebury*). F.M.S. Museum, Type to be deposited in British Museum later.

It would appear pertinent to note here that Townsend erected the genus *Servilliodes* in 1926 for the reception of *sumatrensis*, n. sp. He distinguished it from his *Servilliopsis* as follows: Erect pile short, that of thorax, scutellum, and fourth segment yellow; haustellum half of the height of head; palpi scarcely the length of the antenna, bowed, cylindric and very slender, not flattened; cheek three-fourths the eye length; sternopleurals 2; postacrostichals 3; apical scutellars quite long, convergent to decussate; no stump vein at bend of fourth. I am not, however, impressed with the above summary of characters, as many of them are not dependable as specific criteria and disregard the segregation even as a subgenus.

It may also be pertinent to record the occurrence of *sumatrensis* at the same locality and time as *alticola*. I have compared the specimens with examples identified as *sumatrensis* by Townsend in the U.S. Nat. Mus., and find they agree very closely. Along with the two above species there are also from the same elevation a number of specimens which I identify as *Servillia sobria* (Walker). In this case I have been able to compare the specimens with examples sent to the U.S. Nat. Mus., as *sobria* by Miss D. Aubertin and I find them in complete agreement. This last species more nearly resembles *brevipennis* in general appearance than it does the two just discussed, the pale yellow-dusted bases to the black tergites being very distinctive, but the grey-dusted frontal orbits, and tawny-yellow tibiae and tarsi readily distinguish the species from the one described herein.

I have ready for the press a synopsis of the Oriental species which I hope to publish shortly.

Subfamily Dexiinae.

Genus *Echinodexia*, Brauer & Bergenstamm.

Amongst some Tachinidae recently sent to me by Dr. S. C. Bruner from Cuba I found a species which I place in this genus. In attempting to identify it in

the collection of the U.S. Nat. Mus., I found that it corresponded most closely with *Tropidopsiomorpha tropicalis*, Townsend, but in my opinion this species, which is the genotype, belongs to *Echinodexia*, there being no characters of generic import for their distinction.

Echinodexia cubensis, sp. n.

♂, ♀. Head reddish-brown, more fuscous on occiput and frontal orbits, the latter, the face, cheeks, and occiput quite densely greyish-white dusted, the dust on parafacials and cheeks slightly checkered, ocellar spot, third antennal segment, and apical section of proboscis black; hairs and bristles of head except those on occiput black, the latter yellowish-white. Thorax castaneous-brown, the mesonotum slightly darker on parts posteriorly and with two or four grey-dusted vittae, the hairs and bristles all black. Abdomen brighter castaneous than thorax, with slight indication of a dorso-central blackish stripe in the male, the bristles and hairs all black. Legs castaneous, all femora below at apices, all tibiae at bases, and the entire tarsi black. Wings brownish-hyaline, slightly clouded with brown along the veins. Calyptrae and halteres dark brown. *Length*, 18–22 mm.

♂. Eyes bare, separated at vertex by a distance about equal to the length of the second antennal segment, the frons widening to anterior margin, the interfrontalia almost obliterated above, gradually widening anteriorly, each orbit with a series of quite closely placed and moderately long bristles along the inner margin which extends to antennal insertion but does not diverge from the inner margin in front, the fine hairs laterad of the bristles in several series which stop well before outer margin and descend along the inner half or less of each parafacial to, or almost to, lower level of the eye; ocellars well developed; postverticals much finer and shorter, about equal to the inner verticals; gena over half as high as eye, bare except for the lower marginal bristles and some microscopic hairs close to the vibrissal angle; vibrissae long and strong, situated about as far above the epistome as the length of second antennal segment; face with the usual lateral grooves rather shallow, the central carina narrow and higher above, widening below and almost obliterated just beyond apex of third antennal segment and before attaining the level of vibrissae; third antennal segment narrow, about twice as long as second segment; arista rather densely plumose; parafacials about half as wide as height of gena. Thorax with 3 + 4 dorso-centrals, two pairs of presutural acrostichals, and three postsutural intra-alars, the anterior one close to suture, the prealar long, sternopleurals 2 + 1, propleura and prosternum bare, no hairs below the lower calypter, the latter distinctly angulate at apex on inner side, lying close to scutellum, which has 6 or 8 marginal bristles, the apical pair short and cruciate. Abdomen broad at base, pointed at apex, all of the tergites except the first with numerous discal bristles which are long, erect, and quite strong, covering the entire disc of the third and fourth tergites, those on fourth surrounding the entire tergite. Legs elongate, all femora distinctly attenuated on apical third or more, hind tibiae undulated, and distinctly attenuated on basal third or more; tarsi long, the segments gradually decreasing in length from basal to apical one; mid and hind femora each with some long strong bristles on antero-ventral and postero-ventral surfaces basally, without bristles on ventral surfaces beyond the middle; mid tibia with a short ventral bristle beyond middle; hind tibia with three or four short bristles on antero-ventral, postero-dorsal, and antero-dorsal surfaces. Third wing-vein with a few fine bristles at base; bend of fourth vein angular; costal thorn undeveloped.

♀. Frons at vertex about one-fifth of the head width, no proclinate orbitals present; abdomen less bristly than in male and hind tibiae not attentuated at bases.

Type male, and allotype, Cuba: Sierra Maestra, 10–20.vii.1922, 900–1200 m. (*C. H. Ballou* and *S. C. Bruner*).

Differs from *tropicalis*, Townsend, in having the frons of the male narrower and the third antennal segment entirely black.

A NEW *PROMECOTHECA* (COL. HISPINAE) FROM THE SOLOMON ISLANDS

By S. Maulik, M.A., F.E.S.

Promecotheca guadala, sp. n.

Body oblong, parallel-sided, with a very slight constriction behind the shoulders. Head, prothorax, scutellum, underside and legs bright orange-brown to reddish-brown; eyes black; antennae pitch-brown to black; tarsi sometimes somewhat darker than the general brown colour; elytra entirely blue with violaceous reflections.

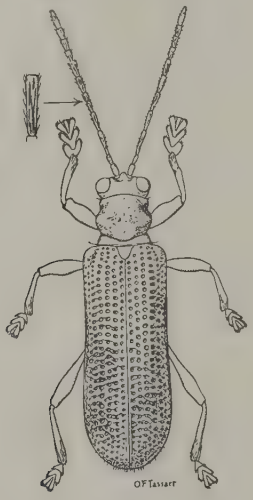


Fig. 1.—*Promecotheca guadala*, sp. n.

Discussion of Relationship.

The apex of each elytron has projecting white hairs which are somewhat longer than those which arise from the punctures of the extreme apical area. The surface of the prothorax is smooth and not wrinkled; there are a few fine punctures in places. There are ten rows of punctures across the basal area and nine across the middle of each elytron; on the apical area the rows of punctures become confused; along the middle of each elytron the surface appears to be transversely wrinkled. A femur is without a tooth on the underside.

The characters enumerated above make the present species related to *antiqua*, Weise, *papuana*, Csiki, and *birói*, Csiki; but it differs from all three in possessing a different colour scheme, which is stated above. *P. opacicollis*, Gestro, has a longer body with the prothorax sharing the colour of the greater part of the elytra.

In *P. antiqua*, Weise, which has a similar build of the body, the colour of the prothorax, and the underside is black or pitch-black, while the apex of the elytra is purple. In *P. papuana*, Csiki, the elytra are testaceous with the apical third nigro-violaceous. In *P. birói*, Csiki, the suture, the lateral margins of the elytra and other parts generally are red.

In spite of the obvious colour differences it is possible that some of this group of species may prove to be varieties of one species. This is a point which can only be settled by the field worker by experimental breeding and observations on their habits.

In the general form of the body, in the absence of costae on the elytra, in the fact that there are some transverse wrinkles on the elytral surface, and in the largeness and confusion of the elytral punctures in places these species resemble one another.

Description.

Head somewhat constricted behind the eyes; the vertex smooth, impunctate; the surface round the roots of antennae slightly depressed; eyes strongly convex; clypeus close to the roots of antennae, somewhat broader than long with the apex slightly emarginate and the surface covered with long hairs. The first segment of antenna thickest and slightly longer than the second; the second the shortest but thicker than the third and following segments; the third the longest, about three times as long as the second; the fourth shorter than the third but equal to the fifth; the fifth somewhat longer than the sixth and the latter somewhat longer than the seventh; the eighth, ninth and tenth almost equal to each other; the eleventh somewhat longer and pointed at the apex; the surface of the first two segments has some scattered hairs but not elongate punctures; the surface of the third segment shows some elongate punctures or long impressed striations and some hairs; the surface of the fourth and the following segments is more thickly covered with elongate impressed striations and stiff hairs. *Prothorax* longer than broad; deeply constricted at the base and less so towards the apex; between the constrictions is a smooth rounded protuberance on each side; the surface without wrinkles, smooth, slightly dimpled in the middle area, and with a few scattered punctures which are more evident in some examples than in others. At each of the four corners a fine hair arises from a pore. *Scutellum* triangular with the apex broadly rounded and the surface somewhat convex, smooth and impunctate. *Elytra* broader at base than the prothorax. Humerus strongly convex and impunctate. Punctate-striate; without a scutellar row of punctures; across the basal area ten rows of punctures, across the middle nine, across apical ten, but somewhat confused; counting from the sutural row the sixth row across the base becomes obsolete across the middle; the punctures are large, the transverse interstices are pronounced in some places especially along the sides and near the middle giving the surface a wrinkled appearance. *Underside* smooth and impunctate; a few scattered white hairs on the abdominal sternites, the last visible sternite and tergite thickly covered with long brownish hairs; along the epipleuron a row of hairs. The hind femur much longer than either the front or the middle; the hind tibia also longer than the front or the middle.

Variation. (*a*) The colour of the elytra may be bluish-green with deeper violet tints.

(*b*) The second segment of the antenna slightly varies in length.

(*c*) The elytral wrinkles are more pronounced in some than in others.

(*d*) The punctures on the pronotum are more numerous in some than in others.

(*e*) The apical hairs of the elytra are more numerous in some than in others.

Length, 7–8 mm.; breadth, 2–3 mm.; length of antenna, 4–4·5 mm.

The larger insect seems to have shorter antennae.

Solomon Islands: Teteri, Guadalcanal, xi.1931 (*R. J. A. W. Lever*).

Food-plant: *Ptychosperma* leaf.

Type and two *paratypes* in the British Museum; the third paratype is with the author, and the fourth with Mr. Lever.

One of the three specimens in the British Museum, was taken in 1887 (*C. M. Woodford*), in the same locality.

A NEW SPECIES OF THE GENUS *SAPHO* FROM SIERRA LEONE

By Cynthia Longfield, F.E.S.

The author has found in the British Museum collection, where they were deposited in 1921, seven specimens of a new species of the genus *Sapho*. All were collected by Jas. J. Simpson in Sierra Leone, West Africa, in the months of April and June 1912.

Sapho fumosa, sp. n.

♂. Abdomen, 47 mm. Hind-wing, 36 mm.

Head: Underside and labium black. Labrum and clypeus metallic emerald-green. Frons, vertex and epicranium emerald-green, the former pruinose. Pedicels of the

Fig. 1.—*Sapho fumosa*, sp. n., left wings of type ♂, × 1⅓.

antennae yellow, the other joints black. Gena black, a yellow patch below. A yellow T-shaped border to the corners of the labrum on either side. Eyes light brown, ocelli

Fig. 2.—*Sapho fumosa*, sp. n. Anal appendages of ♂ from beneath.

golden. *Prothorax:* Emerald-green, slightly bronzed, and pruinose posteriorly and laterally. *Synthorax:* Emerald-green, slightly bronzed laterally. All sutures black.

Pruinose beneath and spreading over the metepimeron, the legs and between the wings. *Legs :* Where not pruinose, black. Tarsi black. *Abdomen :* Emerald-green for the first 3 segments, dark bronze-green for the rest, becoming almost black from 7–10. Underside black. Anal appendages black. *Wings :* Mainly hyaline with an opalescent sheen. A milky-white patch on all four wings has a width of from 6–7 cells before the nodus, to 3 cells beyond the nodus in the fore-wings, and to 6 cells beyond the nodus in the hind-wings. The patch reaches in depth to 4 cells from the lower edge of the fore-wings, and to 7–8 cells from the lower edge in the hind-wings. The tips of all four wings are smoked with dark brown, which reaches more than halfway to the nodus in the fore-wings, and rather less than halfway in the hind-wings, but curving round in the latter to tint the lower edge as far as Cu_1. Pterostigma black.

Type ♂. Sierra Leone : Kamagbonse, 6.iv.1912 (*Jas. J. Simpson*).

One ♂ paratype from Konobita, Sierra Leone, with dimensions the same as the type, has the wings almost completely hyaline. The milky patches on the fore-wings start from 10–11 cells before the nodus and extend no farther than

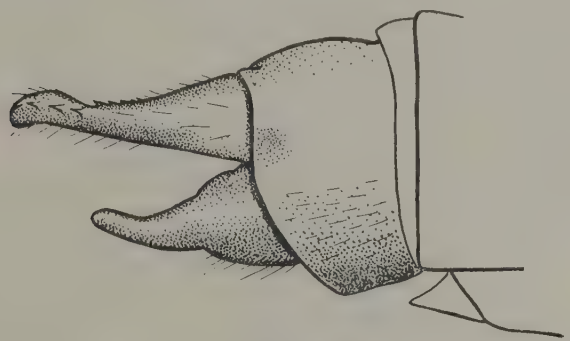


Fig. 3.—*Sapho fumosa*, sp. n. Anal appendages of ♂ from the side.

the nodus, and end only 2 cells from the lower edge of the wing. In the hind-wings the patches start from 9 -10 cells before the nodus, and extend to 3–4 cells beyond, ending 5–6 cells from the lower edge of the wing. The only brown on the wings is a very narrow edging to the tips from the Pt. The whole insect is even more pruinose than the type.

A second ♂ paratype from the type locality has lost the last four segments of the abdomen. Dimensions : Abdomen, 29 mm. for the first 6 segments as against 33 mm. in the type. Hind-wing, 32 mm. The first 3 abdominal segments, and the rest of the insect, very pruinose. The milky patches on the wings are from 3–4 cells narrower than the type, and the smoky tips paler, but of about the same extent.

A teneral ♂ paratype from the type locality has the labrum metallic peacock-blue, the light patches on the head of a livid colour, the mandibles brown, and the sutures and underside of synthorax and abdomen brown. The wings are completely hyaline, with the exception of the milky patches, still present but of even less extent than in any of the other males. Pterostigma buff. Dimensions : Abdomen, 40 mm. Hind-wing, 31 mm.

♀. Abdomen, 39 mm. Hind-wing, 34 mm.

Head : Underside and labium black. Labrum metallic peacock-blue, the T-shaped borders yellow, but the small patch below the gena brown. Clypeus metallic emerald-green. Pedicels of antennae yellow, the rest black. Eyes light brown, ocelli golden. *Prothorax :* Bronze-green, the posterior edge emerald. *Synthorax :* Emerald-green, bronze-green laterally. Sutures black, except the 2nd lateral suture, which is cream-coloured. Underside pruinose. *Legs :* Black, somewhat pruinose. Feet black. *Abdomen :* Emerald-green for the first 3 segments, much darker for the next 3, and the remainder black. *Wings :* Hyaline with an opalescent sheen. The extreme tips of all four wings lightly smoked with brown. Pterostigma brown.

Allotype ♀. Sierra Leone : Yaruwadu, 18.vi.1912 (*Jas. J. Simpson*).

A ♀ paratype from Bafodia, Sierra Leone, has lost the last 6 segments of the abdomen. The first 4 segments are bronze-green. The legs, underside and between the wings are more pruinose than in the allotype. The labrum is metallic emerald-green, and the yellow at the corners is more extended than in the allotype. The wings are faintly tinged throughout with yellow-brown, and with the smoky tips as in the allotype. Dimensions of hind-wing, 36 mm.

A second ♀ paratype from Sandea, Sierra Leone, has lost the last four segments of the abdomen. The whole insect is more bronze-green than the allotype. Very pruinose. The labrum identical in colour with that of the allotype. The wings are rather strongly tinged with yellow-brown, and the smoky tips extend to beyond the pterostigma in all four wings. Dimensions of hind-wing, 34 mm.

Types and paratypes are in the British Museum.

Sapho fumosa seems closest to *S. superba*, Sjöstedt, but differs principally in the following characters :—Wings much narrower; the tips bronze-brown instead of blue-black, and not ending proximally in a hard line; the milky patches in the centre of the wings instead of bordering the dark tips; yellow corners to the labrum instead of black; the females with almost completely hyaline wings. The inferior anal appendages of the male are shorter and thicker than in those of the rest of the genus.

The author is indebted to Mr. D. E. Kimmins for the photograph and drawings that accompany this paper.

NEW ORIENTAL CURCULIONIDAE (COL.)

By Sir Guy Marshall, C.M.G., D.Sc., F.R.S.

Subfamily Brachyderinae.

Antinia pendleburyi, sp. n. (Fig. 1.)

♂♀. Derm black, with dense sandy brown scaling above; prothorax with a very indefinite broad infuscated median stripe, which narrows in front and is often obsolete; elytra with a variable and indefinite dark brown scutellar patch, which at the base does not extend laterally beyond stria 2, and another very variable brown patch behind the middle, usually lying between striae 3 and 6, but sometimes extending very broadly outwards to stria 10 and rarely extending narrowly inwards to stria 1; the sides of the elytra outward of stria 6 and the lower surface grey.

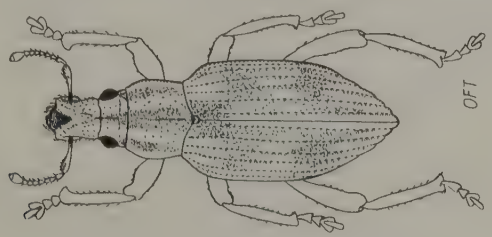


Fig. 1.—*Antinia pendleburyi*, sp. n.

Head with a shallow transverse impression behind the convex eyes; forehead slightly lower than the base of the rostrum, with a deep narrow median sulcus visible through the scaling, and set with erect spatulate setae. *Rostrum* somewhat longer than broad, gradually widening from base to apex, with the lateral margins rounded; the dorsum with a rather indefinite low median costa and a longitudinal impression on each side of it, the sculpture otherwise concealed by the dense suberect scaling. *Antennae* with joint 1 of the funicle a little longer than 2, 3 and 4 as long as broad, the rest transverse. *Prothorax* somewhat broader than long, gently rounded at the sides, widest before the middle, a little narrower at the apex than at the base; the dorsum coarsely rugose, with a faint median sulcus, but the inequalities almost concealed by the dense scaling and recumbent spatulate setae; the pleurae smoother, with sparse punctures visible through the scaling. *Elytra* narrowly ovate or subelliptical, sharply acuminate at the apex, which is not visible directly from above; the striae well marked but, owing to the dense scaling, appearing to be narrow with small elongate separated punctures; the intervals convex, equally raised, except interval 1 which is higher on the declivity, and without tubercles; the dorsal outline rising from the base to one-fourth and thence almost flat to the top of the declivity; the scaling dense and overlapping, the dorsal intervals each with a row of broad recumbent setae, the lateral intervals almost devoid of setae and without granules. *Legs* with dense buff scaling turning to grey beneath and with subrecumbent setae; the tibiae with sharp widely-spaced teeth on the lower edge, the proximal tooth being the largest. *Venter* of ♂

with a strip of erect setae down the middle, the last ventrite with a broad depression bare of scaling and set with erect setae.

Length 5·0–8·5 mm.; breadth 2·0–3·7 mm.

Malay Peninsula: Langkawi Is., West Coast, 6 ♂♂, 14 ♀♀, iv.1928 (*P. Dayang Bunting*).

Of the two previously described species, the genotype, *A. eupleura*, Pasc. 1871, differs *inter alia* in having the upperside uniform buff with green scaling at the sides of the elytra; there is no median costa on the rostrum; the two basal joints of the funicle are equal; the prothorax is as long as broad; the elytra have broad sulci containing widely separated round punctures, and interval 3 bears a large tubercle at the top of the declivity.

In *A. vitiosa*, Fst. 1895, the rostrum shows no costa; the prothorax is as long as broad; the dorsal outline of the elytra is very convex, the punctures are hidden by scaling, the dorsal intervals bear erect setae and the lateral ones have minute shiny granules.

Dermatoxenus hians, sp. n. (Fig. 2.)

♂♀. Derm black, with dense pale green scaling more or less suffused with fawn colour; head and rostrum pale fawn or grey; pronotum with three rather ill-defined, pale fawn

Fig. 2.—*Dermatoxenus hians*, sp. n., head.

stripes, which sometimes invade the whole surface; elytra with a very variable and irregular suffusion of fawn; sternum pale green, the venter and underside of the head grey.

Head with the eyes mid-way between the front margin and the broad basal constriction; forehead with a broad deep bare median furrow. *Rostrum* separated from the head by a deep narrow straight transverse sulcus, strongly dilated from base to apex, the genae being produced into a prominent rounded acute angle; the dorsum with a deep median furrow which is usually bare in ♀ and squamose in ♂; the scaling, like that of the forehead, erect and densely packed, the setae broad, short and recumbent. *Antennae* with dense grey scaling, the club black; the scape very short, not nearly reaching the eye; the funicle with joint 2 somewhat longer than 1, 3 about as long as 1, 4–7 subquadrate. *Prothorax* slightly broader than long, subparallel-sided from the base to the middle, then gradually narrowing to the apex; the dorsum more or less uneven and rugose, with three longitudinal furrows, the median one lenticular and usually bare, the lateral ones subinterrupted in the middle and thinly squamose; the setae like those on the rostrum. *Scutellum* normally concealed. *Elytra* with the sides sinuate from the base to the prominent and subrectangular shoulders, thence parallel-sided to beyond the middle; the striae deep and straight, only the 3rd and 4th slightly sinuate, the contained punctures large and deep, but sometimes partly covered with scaling; the surface of the intervals often somewhat uneven, especially in ♀, interval 4 having a small oval dilatation before or about the middle and another behind the middle; occasionally the intervals are inter-

rupted by inconstant and irregular transverse bare impressions, especially just in front of the anterior dilatation and behind the posterior one, but usually these are absent; the intervals without any granules, but with short inconspicuous recumbent setae. *Legs* rather stout, with dense greenish white scaling more or less tinged with pale fawn; the corbels of the hind tibiae densely squamose internally, and joint 2 of the hind tarsi strongly transverse.

Length 8·3–10·5 mm.; breadth 3·8–5·0 mm.

Malay Peninsula: Penang, 1 ♂ (*A. R. Wallace*); Perak, 3 ♂♂ (*W. Doherty*—type); Kuala Lumpur, 1 ♂; Rim, Malacca, 1 ♂, ii.1908; Batang Padang, Perak, 1800 ft., 2 ♀♀, vi.1923 (*H. M. Pendlebury*); Lubock Tamang, Pahang, 3500 ft., 1 ♀, vi.1923 (*H. M. P.*); Kedah Peak, 3900 ft., 1 ♂, iii.1928 (*H. M. P.*); The Gap, 1 ♂, 1 ♀, 29.ix.1929 (*N. C. E. Miller*). Peninsular Siam: Nakon Sri Tamarat, Khao Ram, 1500–2000 ft., 1 ♀, ii.1922 (*H. M. P.*).

In Dr. Heller's key to the genus *Dermatodes* (1915, *Ent. Mitt.*, **4**: 208) the following species are certainly referable to *Dermatoxenus*, Mshl. 1915: *caesicollis*, Gyll., *vermiculatus*, Gyll., and *chrysochlorus*, Rits.; and probably also the remaining species in his first section.

The present species is most nearly allied to *vermiculatus*, but the latter is a narrower, more elongate insect; the basal constriction of the head is much shallower; the genae are not angulate but normally rounded, the scaling on the rostrum being flat and not erect; the discal striae are much more irregular; the venter is set with small black granules, etc.

Subfamily Nanophyinae.

Nanophyes dipterocarpi, sp. n.

♂♀. Derm black, moderately shiny, fairly densely clothed with short recumbent black setae and sparsely scattered among them are short setiform sharply-pointed white scales; the following white markings formed of similar, but slightly larger, setiform scales: an indefinite transverse band on the anterior margin of the prothorax just above the coxae; a well-defined transverse basal band on each side of the prothorax, starting at the external angle and continued upwards to the same level as stria 5 or 4 of the elytra; on the elytra a rounded spot at the base of interval 2, but not quite reaching the margin; a broad transverse band a little before the middle between striae 5 and 10; and a transverse patch close to the apex between striae 3 and 9; the underside clothed with longer white setae, which gradually become much denser at the sides of the metasternum.

Rostrum very similar in the two sexes, of the same length, a little longer than the pronotum (5·5 : 4), the antennae inserted at one-third from the apex in ♂ and only slightly further back in ♀; a broad low shiny median costa, a shallow punctate stria on each side of it and a deeper one above the scrobe, the punctures in the striae with recumbent white setae; the apical area more finely punctate in ♀. *Antennae* testaceous brown, with the club (or its apical half) and usually the basal three-fourths of the 2nd funicular joint infuscated; scape exceeding the front margin of the eye in both sexes; funicle with joint 2 nearly twice as long as 1, 3 and 4 subequal and longer than broad, 5 shorter, as long as broad; club with the two basal joints obconical, as long as broad. *Prothorax* transverse (4·5 : 7), conical, with the sides quite straight, the base arcuate, and the dorsal outline gently convex. *Elytra* with the shoulders rather prominent and the scutellar area flattened; the striae very fine and shallow (stria 1 deeper), with feeble distant punctures, striae 1–3 much broader and deeper behind; the posterior declivity beginning before the middle and becoming rather abruptly steeper near the apex. *Legs* with one long and four short teeth on the femora. *Abdomen* with the intercoxal process unusually long and narrow; ventrite 5 of ♂ shorter, deeply emarginate at the apex, rather thinly

clothed with longer suberect setae; 5 of ♀ much longer, rounded at the apex and there very convex, with dense recumbent white setae; pygidium of ♂ broadly exposed, almost circular, convex, with dense long suberect setae; pygidium of ♀ only exposed at the tip.

Length 4·2–4·6 mm.; breadth 2·0–2·4 mm.

Java: W. Preanger, 6 ♂♂, 2 ♀♀, bred from fruits of *Dipterocarpus trinervis*, x.1931 (*L. G. E. Kalshoven*).

This striking *Nanophyes* is much the largest species of the genus known to me. Its nearest ally is *N. ligatus*, Hust. 1925, which has the rostrum of the ♀ much longer than that of the ♂ and with the antennae inserted in the middle; the pronotum bears a white spot in the middle of the base; on the elytra there is a white spot on interval 2 at one-third from the base, the transverse white band lies behind the middle and extends inwards to stria 1, and the white setae are confined entirely to the striae, etc.

Subfamily Attelabinae.

Apoderus undatus, sp. n.

♂♀. Piceous to red-brown, somewhat paler beneath, with the rostrum and the sides of the head black or blackish; legs bright testaceous red, the hind pair with the apex of the femora and the extreme base of the tibiae blackish.

Head similar in the two sexes, the length from the constriction 1·5 times the width across the eyes, the sides almost straight; forehead with large shallow confluent punctures; vertex with a shallow median longitudinal sulcus and deep transverse striae, which become more shallow at the sides and beneath. *Antennae* testaceous red, with the scape blackish, except at the base; funicle with joints in order of length: (1, 2), 3, 4, (5, 6), 7, the last three transverse, especially 7; the club with joint 1 longer than broad, 2 slightly transverse, 3 + 4 as long as 1. *Prothorax* rather shorter than its basal width, conical, straight at the sides, with a well-marked median furrow and deep arcuate striae on the disk, the pleurae shiny and impunctate. *Scutellum* trapezoidal, with the hind margin sinuate in the middle. *Elytra* nearly as broad as long, slightly dilated behind the middle, each with a large rounded depression in the basal fourth; the striae deep, with indefinite confluent punctation both on the disk and at the sides and apex, striae 2 and 3 curving outwards at about the middle; the intervals rather ill-defined and very strongly rugose throughout. *Legs* with the middle tibiae slightly wider and more dilated from base to apex in ♀ than in ♂.

Length 6·6–7·2 mm.; breadth 3·3–3·6 mm.

Malay Peninsula: Kedah Peak, 3950 ft., 3 ♂♂, 3 ♀♀, iii.1928 (*H. M. Pendlebury*).

Most nearly allied to *Apoderus crenatus*, Jek. 1860, which is a considerably larger insect having the legs concolorous with the body and without black markings on the head and hind femora; the forehead bears at most only a few small punctures, and the striae on the vertex are much finer; on the pronotum the striae are curved more forwards at the sides and the apical sinuation is much deeper; the intervals on the elytra are less rugose and the punctures in the striae more distinct.

Subfamily Cryptorrhynchinae.

Zeugenia gluteae, sp. n.

♀. Derm black; prothorax with a patch of dark brown scales in the middle of the disk divided by a +-shaped grey marking, laterally with an ill-defined patch of pale brown and grey scales; scaling on elytra light brown, with variable irregular elongate dark brown

spots, most numerous on intervals 2 and 3, and a few scattered grey scales, which form a constant pale spot before the middle on interval 5.

Head with shallow subreticulate punctation, a deep frontal fovea, and a narrow sulcus above each eye. *Rostrum* as long as the head and pronotum, strongly curved, with the antennae inserted behind the middle; the basal area coarsely punctate and with a very short median carina. *Antennae* honey-brown, the scape short, about as long as the first three funicular joints; funicle with joints 1 and 2 equal, 5 as long as broad, 6 and 7 transverse; club elliptical, unsegmented. *Prothorax* strongly transverse (3 : 2), widest at the base, narrowing in a regular curve to the apex, and there only shallowly constricted; the median basal process rounded and bearing a small low glabrous elevation; the dorsal sculpture not concealed by the scaling, with coarse subreticulate punctures and no trace of a median carina; the dark scales club-shaped and erect, the pale ones broadly spatulate, suberect on the disk, subrecumbent laterally. *Scutellum* small, rhomboidal, sparsely squamose. *Elytra* broadly subelliptical, only slightly broader at the shoulders than the prothorax (11 : 9), parallel-sided from the shoulders to the middle, with a feeble subapical impression and no definite callus; the striae broad and deep, with deep oblong squamose punctures; the intervals rather broader than the striae, of equal height, rugulose but not tuberculate, int. 9 subcarinate from the hind coxae to near the apex; the dorsal outline rather strongly convex, highest before the middle, and sloping rather steeply at the base. *Legs* with rather strong subconfluent punctures and separated oblong pale scales; femora broad and scarcely clavate, with one large tooth and a small one at some distance beyond it; tibiae angulate externally near the base, narrowing to the apex, tricarinate on the ventral surface and there shallowly sinuate in the middle.

Length 5·3–6·0 mm.; breadth 2·75–3·2 mm.

South India: 5 ♀♀ from seeds of *Gluta travancorica*.

The specimens here described were found as a result of quarantine inspection in Honolulu, and were forwarded by Mr. O. H. Swezey.

Despite its somewhat different facies, due to the entire absence of tubercles and tufts of setae, this species is placed in *Zeugenia*, Pasc. 1871 (genotype, *histrio*, Pasc.), because it exhibits the following combination of characters: Antennae inserted behind middle of rostrum (♀), the club unsegmented; mesosternal receptacle reaching hind margin of middle coxae and over-arched behind; the scarcely clavate and bidentate femora, which are sulcate throughout beneath; tibiae angulate externally near the base and narrowed apically.

Gluta travancorica is a tree that yields a useful red timber.

Trochorrhopalus sacchari, sp. n. (Fig. 3.)

♂♀. Derm black or piceous, shiny, with a uniform silky grey indumentum above and below.

Head with distinct separated punctures dorsally; eyes separated beneath. *Rostrum* as long as the pronotum, gradually dilated from the base to the antennae and there obtusely subangulate in ♀ (much less so in ♂), then rapidly narrowing in front; the dilated basal area with a fine median stria and some irregular rows of punctures (normally hidden by the clothing); the indumentum continued almost to the apex in ♂, leaving a bare impunctate median line. *Antennae* with the club-like 7th funicular joint a little longer than broad. *Prothorax* slightly longer than broad, gently rounded at the sides, widest near the middle, strongly constricted at the apex, the constriction continued shallowly across the disk, the basal margin arcuate; the dorsum more convex than usual, but with an oval flattened area in the middle of the basal half, rather unevenly set with separate rounded punctures. *Scutellum* rounded. *Elytra* oblong-ovate, only 1·6 times as long as broad, parallel-sided from the sloping shoulders to the middle, not flattened on the disk, with deep striae containing very shallow punctures; the intervals quite flat and

of equal height, each with an often irregular row of pubescent punctures. *Legs* with dense grey indumentum; femora with scattered pubescent punctures, some very short erect golden setae on the dorsal edge and longer ones beneath. *Venter* with sparse punctures, each containing a very short subrecumbent spatulate seta, anal ventrite without any patch

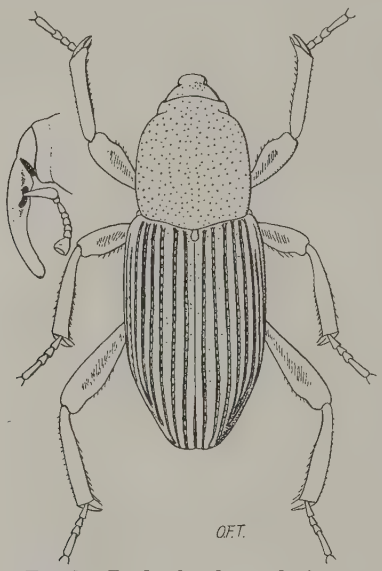


FIG. 3.—*Trochorrhopalus sacchari*, sp. n.

of long setae; pygidium with four irregular punctate impressions on the basal half of the exposed portion.

Length 6·5–9 mm.; breadth 2·5–3·5 mm.

BURMA: Sahmaw, 2 ♂♂, 2 ♀♀, bred from stems of sugar-cane, xi.1931 (*C. C. Ghosh*).

The dorsally punctate head, the lack of sulci on the pronotum, the entirely flat and uniform intervals on the elytra, and the four (instead of three) impressions on the pygidium, will serve to distinguish this species, which superficially resembles a small *Cosmopolites*.

Subfamily SIPALINAE.

Cryptoderma perakense, sp. n.

♂♀. Derm black, with the usual light brown indumentum (becoming fuscous when greasy and sometimes entirely abraded); prothorax with a narrow median white line and a broader stripe on each side; elytra with the pattern of the white lines as in *discors*, F., *hydropicum*, Chev., and *fabricii*, Rits., but differing from them all in having the basal margin also white from the suture to interval 6, and without any white on the lateral margins; underside with a somewhat irregular white stripe from the front margin of the prosternum, along the side-pieces of the meso- and meta-sterna to ventrite 4, being produced inwards along the hind margin of ventrite 1.

Prothorax longer than broad (10 : 9), parallel-sided from the base to the middle, then

narrowing in a gentle curve, with a deep narrow constriction near the apex which is not continued across the disk, the basal margin much more shallowly bisinuate than usual; the dorsum only slightly convex longitudinally, highest in the middle, with large deep rounded punctures that are bare in the centre, the intervals as broad as or broader than the punctures and unevenly raised. *Scutellum* entirely enclosed in front, ovate, white. *Elytra* elongate, twice as long as broad, only slightly wider than the prothorax, jointly and shallowly sinuate at the base, parallel-sided from the base to the middle and gradually narrowing behind, without any subapical constriction or posterior callus, the basal margin not elevated or crenulate in either sex; the dorsal outline rather strongly convex, highest about the middle, sloping straight to the base, there being no transverse juxta-basal depression; the broad striae containing large deep rounded or elongate punctures, each of which has a large bare median space, striae 5 and 8 approximated at the base, 6 and 7 not nearly reaching the base and more or less confused; the intervals more or less sinuous, not wider than the septa between the punctures, 3 and 5 higher than the others near the base, 2 and 4 not reaching the base. *Sternum* without any elevation on the metasternum in front of the hind coxae, and with no row of punctures on the metepisterna.

Length 10·0–17·5 mm.; breadth 3·2–6·2 mm.

Malay Peninsula: Perak, mountains, 5 ♂♂, 2 ♀♀ (*Doherty*); Larut Hills, 3000–4500 ft., Perak, 17 ♂♂, 14 ♀♀, ii.1932 (*H. M. Pendlebury*—type).

Apart from the white basal margin to the elytra, this insect differs from all the previously described species having the X-shaped white marking in that the bases of the elytra are not separately arcuate but jointly sinuate and quite similar in the two sexes; whereas in the other species the bases of the elytra are elevated and notched in the ♂. It also differs from them (except *plicatipenne*, Rits. 1912) in having striae 7 and 8 somewhat confused and remote from the base, as well as in the absence of posterior calli.

Cryptoderma inchoatum, sp. n.

♂♀. Very similar in general facies to *C. perakense*, sp. n.; with the usual three white stripes on the pronotum; elytra with a white stripe only on interval 6, which is sometimes obsolete near the apex, the X-like marking very narrow and usually obliterated in the middle, sometimes with only the anterior arms of the cross present, sometimes almost entirely obsolete, the basal margin not white; underside with a narrow stripe on the prosternum above the coxae, interrupted on the mesosternum, then continued on the metepisterna and the sides of the four basal ventrites, being produced inwards on ventrites 1, 3, 4.

Prothorax slightly longer than broad, widest at the base, very gradually narrowing to the middle, then curving in to the apex, with a deep narrow subapical constriction, which is not continued across the disk, the base shallowly bisinuate; the punctures much smaller and more numerous than in *perakense* and each containing a very short erect seta. *Scutellum* not entirely enclosed in front, narrowly elliptical, brown. *Elytra* rather broader, less than twice as long as broad, and less acuminate behind, only slightly wider than the prothorax and jointly sinuate at the base, without any posterior constriction or callus, the basal margin simple; the dorsal outline much flatter, hardly sloping towards the base; the striae broad, with much more regular smaller rounded punctures containing a median bare spot with usually a pale ring round it, stria 6 reaching the base, but 7 ceasing at a short distance from it, and both quite regular; the intervals rather narrower than the striae, quite regular, 3 and 5 slightly higher than the others, more so at the base, 2 and 4 reaching the base. *Sternum* as in *perakense*.

Length 13·5–18·5 mm.; breadth 5–7 mm.

Malay Peninsula: Sungei Bertam, 4800 ft., Perak, 1 ♂, 1 ♀, ix.1922 (*E. Seimund*—type); Tanah Rata, 4800 ft., Cameron's Highlands, Pahang, 2 ♀♀, xi.1923 (*Chulow & Kedit*).

Subfamily Cossoninae.

Phloeophagosoma orchidarum, sp. n. (Fig. 4.)

♂. Shiny black, with the epistome, antennae, tarsi, and tibial uncus testaceous brown. *Head* with the globular vertex set with a few sparse minute punctures and separated from the anterior part by a feeble constriction; the front part with fine but larger punctures that are separated by more than their own diameters; the forehead not very convex, without any median fovea, with a shallow transverse depression where it joins the rostrum; on the underside of the head the opaque aciculate scrobes are continued broadly almost to the transverse gular impression, being much broader than the median sulcus and separated from the lower margin of the eye only by a narrow low ridge. *Rostrum* longer than the head (3 : 2), strongly curved, slightly widening from the base to the antennae, then sinuate laterally, and broadly and roundly dilated at the apex, the apical margin with two projecting lobes; the punctures like those on the head but rather denser. *Antennae* with the scape reaching the base of the eye; funicle with joint 1 somewhat

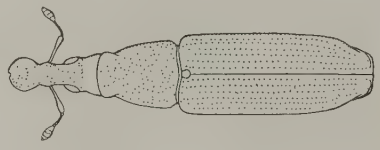


Fig. 4.—*Phloeophagosoma orchidarum*, sp. n.

longer than broad, 2 very transverse and not longer than 3. *Prothorax* longer than broad (5 : 4), subconical, gently rounded at the sides, widest close to the base and there subangulate, being abruptly narrowed behind, gradually narrowing anteriorly, deeply constricted near the apex, the constriction continued shallowly across the disk; the dorsum with rather fine distant punctures leaving an abbreviated smooth median line; the base finely marginate and feebly bisinuate. *Scutellum* rounded, impunctate. *Elytra* subcylindrical, only slightly wider than the prothorax at the rectangularly rounded shoulders, finely and shallowly striate, the contained punctures small and separated by about their own diameters, becoming obsolete towards the apex; the intervals with an often irregular row of minute punctures. *Legs* sparsely punctate. *Underside* with the intercoxal pieces of the prosternum and venter much narrower than the respective adjoining coxae.

Length 3·8–4·1 mm.; breadth 1·0–1·2 mm.

Java: Buitenzorg, 2 ♂♂, ii.1932 (*Dr. S. Leefmans*).

This species agrees with the typical forms of *Phloeophagosoma* in the narrowness of the intercoxal spaces (in *Oxydema* these are fully as broad as the adjoining coxae), but the strongly constricted prothorax and the dilated rostrum give it the superficial appearance of a small *Oxydema*. The prolongation of the scrobes so far back on the head is an unusual character.

The specimens received were reared by Dr. Leefmans from orchids, but it is not clear whether it is a primary enemy, as the plants were also attacked by *Acythopeus orchivora*, Blkb. The latter species was described from specimens found in Australia, but the Malay Archipelago is almost certainly its original habitat.

A NOTE ON THE GENUS *VERMITIGRIS*, WHEELER (DIPTERA, RHAGIONIDAE)

By F. W. Edwards, M.A., Sc.D., F.E.S.

(*British Museum, Natural History.*)

In his entertaining book, "Demons of the Dust," published last year,* Prof. W. M. Wheeler gives an extended account of the early stages of the Vermileoninae, including a Sumatran species collected by Mr. G. Fairchild in 1926, for which he proposes the new generic name *Vermitigris*. Wheeler was unable to rear the adult, and his definition of the genus is drawn entirely from larval and pupal characters. After giving some account of the habits of the larvae, which fed voraciously on termites, Wheeler gives the following description of the larva and pupa (pp. 272–4):

"The full-grown, outstretched larva measures 23 to 24 mm. and is therefore larger than that of any other known species of Vermileoninae. At first sight it closely resembles the larvae of *Vermileo* and *Lampromyia*, but closer examination reveals several peculiarities. The most striking of these is the structure of the pseudopod (Fig. 25, i, j) on the ventral side of the first abdominal segment. In profile the tip of this appendage is evenly rounded and hemispherical, with a distinctly differentiated and uncleft papilla and with a low median longitudinal thickening bearing a series of straight, rigid, radiating spines, shorter at the ends of the series than in the middle. These spines vary in number, apparently, with the age of the larva, a full-grown specimen having six, the smallest four and an individual of intermediate size, five. The body of the larva is covered with very short, fine, uneven hairs and there are the usual long hairs on the sides of the thoracic annuli, the sides of the thoracic segments and the borders of the four anal lobes, which are rather short and thick. There are, however, several much longer, stouter, recurved bristles of a dark brown or blackish colour. One series of these forms the comb on the posterior border of the eighth abdominal segment, but there are only twelve of them, six on each side of the median line, and they are not flattened at the base as in *Vermileo* and *Lampromyia* but cylindrical and alternating with them is a second series of similar and much shorter bristles. There are also series of three stout dark-coloured bristles on each side of the middle line and arising from paired transverse swellings or welts on the dorsal and ventral sides of the seventh and the dorsal side of the sixth abdominal segment. The mouth-parts and cephalopharyngeal apparatus are much like those of *Lampromyia*, the head-capsule being black, robust, heavily chitinized and scarcely more than twice as long as broad, but the ventral tendon, which is very narrow and incompletely chitinized in *Vermileo* and *Lampromyia*, forms a distinct linear sclerite, like the piece which I have called the gula, but shorter. The mandibles are stout, with rather coarsely serrated borders. The spiracles are large and distinctly chitinized and their radial tubules, which number six in the anterior and ten in the posterior pair, are unusually large and distinct.

"The pupa (Fig. 47) measures 15 mm. and is dark brown, with thicker, more brittle and smoother integument than in *Vermileo* and *Lampromyia*. Although the crumpled last larval skin firmly envelops the two posterior segments as in those forms, there is no adherence of sandgrains to the surface. This seems, however, to have been covered during the last larval ecdysis with a whitish

* 1931. London: Kegan Paul, Trench, Trübner & Co.

but non-sticky secretion. The body is long and narrow, the thoracic dorsum very convex and rounded, the abdominal segments somewhat flattened dorso-ventrally. The head has a very broad face and the antennae are widely separated, with long aristae and enclosed in free sheaths directed downward along the inner borders of the eyes. The latter seem to be much smaller and less convex than in *Vermileo* and *Lampromyia*. The proboscis is short and stout and, therefore, more like that of *Vermileo* than *Lampromyia*. The caudal segment terminates in a pair of long, slender, curved, diverging appendages. There are no traces of tubercles or spines on the abdominal segments and only the spiracles of the second and third segments are borne on distinct tubercles.

"The foregoing description of the larva and pupa of the Sumatran insect shows that it differs from both *Vermileo* and *Lampromyia* more than these genera differ from one another. Outstanding peculiarities of the larva are the character of the pseudopod and of the setal comb on the eighth abdominal segment, and of the pupa the structure of the antennae, the small size of the eyes and failure to acquire an envelope of sandgrains. I believe, therefore, that the insect must represent an undescribed genus and species of Vermileoninae, and propose to call it *Vermitigris fairchildi* after its discoverer."

Wheeler also quotes the late R. Shelford on the habits of another similar Vermileonine larva found in Sarawak, and states that no species of the subfamily had hitherto been described and named from the East. In this statement, however, he was mistaken, as Brunetti * recently described a Malayan species under the name *Lampromyia orientalis*, from specimens collected and reared by Mr. H. M. Pendlebury at Batu Caves, near Kuala Lumpur, and on Bukit Kutu (3500 ft.), Selangor, in 1923 and 1926 respectively.

Brunetti's type of *L. orientalis* is in the British Museum, and as I suggested to him when he drew up his description in 1925, its characters seem sufficiently distinctive to warrant the erection of a new genus. It is clearly not a *Lampromyia*, because it has the very short, thick proboscis of *Vermileo*, and one must suppose it was a mere slip on Brunetti's part to place it in the former genus instead of the latter. It is not so easy to understand why he omitted to describe the wing-veins, and merely remarked "venation normal"; as a matter of fact the venation, particularly as regards the radial fork, is very distinctive and abnormal.

In order to establish definitely the generic location of *L. orientalis*, Mr. Pendlebury has recently been so kind as to present to the British Museum a pair of specimens from his original series (a male from Batu Caves and a female from Bukit Kutu), each with the pupal and attached larval skins from which they emerged.

On macerating the pupal skin of one of these specimens of *L. orientalis*, and removing and stretching the larval skin which had remained attached to the last two abdominal segments of the pupa, it was at once evident that the skins showed several striking resemblances to Wheeler's description and figures of *Vermitigris fairchildi*. In the pupa, the form of the widely-separated antennal sheaths and the pair of long spine-like processes at the tip of the abdomen, are quite as in Wheeler's figure. In the larva, the most noteworthy resemblances include the form of the proleg of the first abdominal segment, which is simple, with a median longitudinal row of strong spines; the form of the comb on the posterior margin of the eighth abdominal segment, which includes only six strong spines on each side, together with a number of much shorter spines; and

* 1927. F.M.S. Mus. J., **13**: 13.

the presence of paired groups of strong spines dorsally and ventrally on the sixth and seventh abdominal segments. But there are also some noteworthy differences. Wheeler describes the integument of the pupa of *V. fairchildi* as being quite smooth, without adhering sandgrains, and with only the second and third pairs of abdominal spiracles set on distinct tubercles; the Malayan pupae have a good deal of fine sand adhering to the integument, and each of the first seven abdominal segments have the spiracle set on a small tubercle, and beyond this on the lateral margin of the segment is a short, pale, spine-like process. In the Malayan larval skin examined the pseudopod of the first abdominal segment has only three strong spines in the row, not six as described by Wheeler for full-grown specimens of *V. fairchildi*; also the armature of segments 5–7 of the abdomen is different, as each of these segments in *L. orientalis* carries spines or bristles both dorsally and ventrally; on segment 5 the dorsal bristles are short, the ventral bristles much longer but slender and pale; on 6 the paired groups of stout, dark bristles are placed close together both dorsally and ventrally, each group having 3–4 long and 2–3 short bristles; on 7 the dorsal groups of several short bristles are placed very wide apart, near the sides of the segment, but the ventral groups, each of three long, stout bristles,

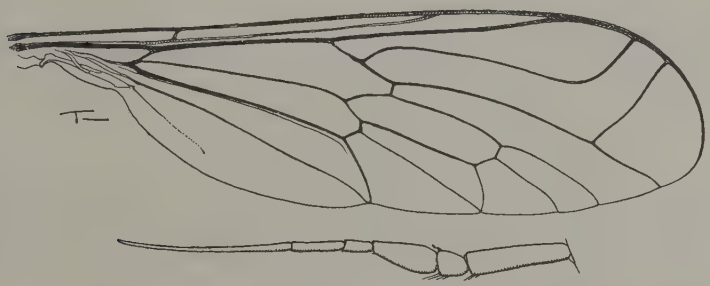


Fig. 1.—*Vermitigris orientalis* (Brun.). Wing and antenna.

are quite close together; the head-capsule also seems to be rather longer than in *V. fairchildi* (fully twice as long as broad), and without chitinisation of the ventral tendon.

From these facts it seems safe to conclude (1) that *Lampromyia orientalis*, Brun., belongs to the genus *Vermitigris*, Wheeler, but that (2) *Vermitigris fairchildi*, Wheeler, is not synonymous with *V. orientalis* (Brun.).

As regards adult characters of the genus *Vermitigris* (as exhibited by *V. orientalis*), these are in general very similar to those of *Vermileo*, notably in the short, thick proboscis and presence of well-marked hairy pulvilli and pulvilliform empodium. The chief distinctions from *Vermileo* are (1) the form of the antennae, in which the first segment is unusually long, longer than the combined lengths of the second and the basal portion of the third, and the two basal segments of the elongate style are very stout; and (2) the venation, in which R_{2+3} takes an unusually sinuous course (somewhat as in *Lampromyia pallida*, Macq.), and the fork of R_{4+5} is remarkably wide, R_4 being straight and approximating to the vertical. Wheeler suggested, from an examination of the pupa of *V. fairchildi*, that the eyes were much smaller than in *Vermileo* and *Lampromyia*, but this is not the case in *V. orientalis*, where the front is narrow in both sexes, only slightly wider in the female than in the male. It is note-

worthy that although in the pupa of *V. orientalis* (as in *V. fairchildi*) the antennae are very wide apart, in the adult they are practically contiguous.

Another point worthy of note is that in all specimens of *V. orientalis* examined the fourth posterior cell is closed on the margin of the wing. In this respect the Malayan species resembles *Lampromyia* rather than *Vermileo*, all three palaearctic species of *Lampromyia* having this cell closed, whereas *Vermileo* normally has it open. This distinction, however, is not of much significance, as the condition of the fourth posterior cell is often subject to individual variation; the British Museum possesses two specimens from the Sudan (larvae collected by R. A. Wardle in 1925, reared at Manchester by H. Britten in 1927) which seem to represent a variety of *Vermileo degeeri*, and in these the fourth posterior cell is closed.

In regard to the occurrence of *V. orientalis*, Mr. Pendlebury notes: "I know of two places where they occur. One is outside the Batu Caves (about 7 miles from here) and the other spot is under a rock at about 3,300 feet on Bukit Kutu. Like Ant Lions, they only thrive in perfectly dry, finely divided soil of dust-like consistency."

TWO NEW SPECIES OF ENCYRTIDAE (HYM.) FROM KENYA COLONY

By A. B. Gahan.

(*Bureau of Entomology, United States Department of Agriculture.*)

The two species described in this paper were reared by R. H. Le Pelley in Kenya Colony, Africa, and were referred to the writer for identification through the Imperial Institute of Entomology. Both species apparently belong to the genus *Aphidencyrtus*, despite the fact that one of them is said to have been reared from a Coccid.

Family Encyrtidae.

Aphidencyrtus africanus, sp. n.

This appears to be a quite typical representative of the genus *Aphidencyrtus*, and it differs from *A. aphidivorus* (Mayr) principally in details of coloration. In *aphidivorus* the fronto-vertex is black, the mesoscutum blackish with only a slight metallic tinge, the front tibiae blackish except at apex, the middle tibiae with a broad blackish band occupying over half their length, and the hind tibiae black for approximately three-fourths of their length. In the new species the fronto-vertex has a distinct greenish cast, the mesoscutum is distinctly metallic green, the front tibiae are pale, the middle tibiae pale except for a very narrow band near base, and the black band on hind tibiae is not broader than the apical pale band. This new species may be distinguished from the following by the more convex and more weakly sculptured scutellum as well as by the colour of the legs.

Female.—Length, 1·0 mm. Head not quite as broad as thorax at tegulae, the occiput broadly concave with its margins acute; fronto-vertex much longer than broad, shagreened, with a few obscure larger punctures; ocelli in a nearly equilateral triangle, the lateral pair almost touching the eye-margins; eyes extending to the posterior margin of head, covered

with short pile; scrobes triangular, hardly attaining middle of eyes, finely shagreened as are also the face and cheeks; head viewed from in front as broad as high, narrowed below, the malar space equal to about half the height of eye; mandibles not seen. Antennae inserted near the clypeus; scape slender, not reaching the front ocellus; pedicel fully twice as long as broad; funicle slender, gradually increasing in thickness toward apex, the basal four joints small, subequal and subquadrate, the fifth and sixth funicle joints broader and each very slightly longer than broad; club twice as broad as the funicle, elliptical, more than twice as long as broad, about equal in length to the last four funicle joints, 3-jointed; funicle joints with a few coarse hairs, the hairs on club not conspicuous. Thorax slightly longer than broad; mesoscutum very weakly shagreened and shining, more than twice as broad as long; axillae meeting; scutellum convex, rounded at apex, sculptured about like the mesoscutum and slightly shining; propodeum short and practically smooth. Legs normal, the middle tibial spur a little longer than the basitarsus. Fore-wing a little longer than the body of the insect, measuring 1·15 mm. in the type; marginal vein at least twice as long as broad, and about as long as the short stigmal; postmarginal shorter than stigmal; marginal cilia short; discal cilia distad of hairless line finer and much closer than proximad of it. Abdomen short, as broad as long or broader than long, the tip of ovipositor barely visible.

Fronto-vertex greenish, face and cheeks purplish-black; mesoscutum, propodeum laterally, and base of abdomen above, shining metallic green; scutellum and maxillae bronzy; thorax beneath, and abdomen except at base above, black; wings hyaline; all coxae, all femora, a very narrow band near base of middle tibiae, and a broad band on hind tibiae black; all trochanters, narrow apical bands on front and middle femora, front tibiae entirely, middle tibiae except band near base, narrow basal band and apical half of hind tibiae, and all tarsi pale yellowish; antennal scape and pedicel black, with their extreme apices pale; flagellum and club brownish-black.

Male.—Length, 1·05 mm. Fronto-vertex about as long as broad, slightly broader than in the female; antennae filiform, slender; scape slender, subcylindrical; pedicel about as broad as long; funicle joints clothed with moderately long hairs, the first to fourth joints subequal and each about twice as long as broad, following funicle joints and the club not seen. Abdomen subtriangular, shorter than the thorax. Scape mostly testaceous, with a brownish streak above; pedicel dark; flagellum brownish-testaceous; middle femora entirely pale yellow; hind tibiae with the blackish band broader than in the female, occupying about two-thirds of its length; abdomen black, with no metallic green band at base.

Type-locality. Kenya Colony: Kiambu.

Two females and one male said to have been reared from *Toxoptera coffeae*, Nietner, by R. H. Le Pelley, September 2, 1929. The holotype female, and allotype male deposited in the U.S. National Museum, Cat. No. 43884; a paratype female in the British Museum.

Aphidencyrtus coccidicola, sp. n.

This species differs somewhat from typical *Aphidencyrtus* in that the scutellum is finely and deeply sculptured, and the mandibles are truncate at apex with only a very slight indication of a marginal sinus near the anterior apical angle. These characters as well as the general appearance of the species remind one of the genus *Ooencyrtus*, but the marginal vein is much longer than in that genus. It runs readily to *Aphidencyrtus* in Ashmead's classification, and except for the scutellum and mandibles agrees with that genus. It is accordingly placed in *Aphidencyrtus*, at least until its relationship is better understood.

Female.—Length, 1·0 mm. Head as broad as the thorax, broadly concave behind, the angle between vertex and occiput acute; fronto-vertex very nearly as broad as long, shagreened, with a few larger punctures scattered over its surface; ocelli in an equilateral triangle, the ocellocular line a little shorter than the diameter of a lateral ocellus; eyes moderately large, extending to the posterior margin of head, sparsely hairy; scrobes triangular, extending to about the middle of eyes, finely shagreened, as are also the face and cheeks; head viewed from in front a little broader than high, the malar space equal to approximately half the height of eye; mandibles practically edentate, with only a very slight marginal sinus or indentation. Antennae inserted at the clypeus or distinctly below the eyes, separated at base by a low ridge which is not carinate; scape slender, subcylindrical or slightly fusiform, not attaining the front ocellus; pedicel about one and one-half times as long as thick; funicle 6-jointed, the first, second, and third joints subequal, each about as broad as long, and distinctly narrower than the fourth joint; fourth and fifth joints of funicle slightly longer than broad and distinctly longer and thicker than the third, the fourth very slightly narrower than the fifth; sixth funicle joint quadrate, about as broad as the fifth; club 3-jointed, ovate, about as long as three preceding funicle joints and distinctly broader than the last funicle joint; the whole antenna clothed with coarse hairs, those on the funicle joints as long as the joints or nearly so, those on the club shorter. Thorax about one and one-third times as long as broad; mesoscutum weakly reticulated and shining, nearly twice as broad as long; axillae nearly smooth, meeting in front of scutellum; scutellum finely and strongly reticulate-punctate, subtriangular in outline and not strongly convex; propodeum short, polished. Legs normal, the middle tibial spur equal to the basitarsus in length. Fore-wing longer than the insect, measuring 1·15 mm. in the type; marginal vein longer than either the stigmal or the postmarginal, about three times as long as broad; stigmal and postmarginal short and subequal; marginal cilia short; discal cilia beyond hairless line fine and close, basad of hairless line coarser and much more sparse, an elliptical area behind the basal half of submarginal vein bare. Abdomen short, nearly circular, a little broader than long, smooth and polished, the ovipositor concealed.

General colour black with a slight aeneous tinge in some lights, the scutellum dull greenish; antennae brownish-testaceous, the club dark brown to blackish; legs pale yellow, the middle and hind coxae for the most part and the apical half or more of hind femora brownish-fuscous or blackish; wings hyaline.

Male.—Length, 0·90 mm. Antennae filiform, slender, hairy, the scape a little more than twice as long as broad, broadest at the middle; pedicel globose; funicle joints successively decreasing in length, the first about four times as long as broad and as long or nearly as long as scape, the sixth about twice as long as broad; club no broader than the funicle and not as long as the two preceding joints combined. Some of the hairs on the funicle are approximately as long as the joints. Abdomen triangular, much shorter than thorax. Otherwise like the female.

Type-locality. Kenya Colony: Kiambu.

Described from a series of 26 specimens, 20 ♀♀ and 6 ♂♂, received from the Imperial Institute of Entomology, London, and said to have been reared from a Coccid (No. 203) on citrus, by R. H. Le Pelley. The type, allotype, and eleven paratypes are deposited in the U.S. National Museum and bear type Cat. No. 43885. Thirteen paratypes comprising both sexes are deposited in the British Museum.

NEW SPECIES OF LAMELLICORN BEETLES (SUBFAM. COPRINAE) FROM SOUTH AMERICA

By Gilbert J. Arrow, F.E.S.

With the exception of the single specimen last described the beetles forming the subject of this paper, all contained in the British Museum, have been kindly presented to the Museum collection by Mr. Hermann Luederwaldt, of the Sao Paulo Museum, S. Brazil.

Zonocopris, gen. n.

Corpus breve, medio valde constrictum. Caput latum, clypeo acute bidentato. Antennae 9-articulatae, clava magna. Prothorax convexus, basi depressus, lateribus retrorsum convergentibus. Elytra convexa, antice angustata, epipleuris latis, lateribus fortiter arcuatis. Pedes validi, tibiae omnes deplanatae, leviter arcuatae, gradatim dilatatae, anticae extus acute tridentatae, apice recte truncatae, intermediae et posticae apice haud latissimae: tarsi breves, articulis 1–4 fere aequalibus, 5 longo, apice spinoso, unguibus minutis, gracilibus. Thorax subtus antice utrinque profunde excavatus. Mesosternum postice bifoveolatum. Metasternum longum, coxis intermediis modice separatis.

Zonocopris bucki, sp. n. (Fig. 1.)

Niger, nitidus, corpore supra et subtus setis brevibus raris vestito; capite plano, sat crebre punctato, margine antico arcuato, dentibus 2 acutis modice separatis, pronoto

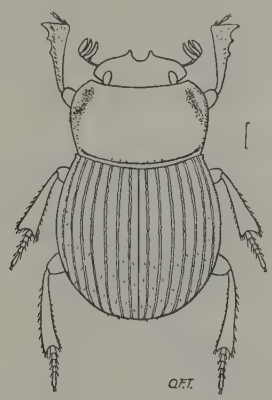


Fig. 1.—*Zonocopris bucki*, sp. n.

medio sat minute, lateraliter grosse punctato, lateribus antice paulo dilatatis, postice rectis, convergentibus, basi profunde sulcato; elytris late haud profunde striatis, striis ex punctis magnis confluentibus compositis; metasterni medio nitido, minute sat parce punctato, lateribus grosse et rugose punctatis, opacis.

Long. 4–5 mm.; lat. max. 2·5–3·5 mm.

S. Brazil: Porto Alegre (*P. Buck*), April, Oct.

Paraguay.

The habits of this insect appear to be highly peculiar. Mr. Buck discovered numerous examples concealed within the shells of living specimens of a large

terrestrial snail believed to be *Bulimus* (*Strophochilus*) *oblongus*, Müll. As many as 12 of the beetles were found within a single shell.

As in most other members of the group of Coprinae to which the genus belongs, the sexes appear to be externally alike.

This remarkable insect is unlike any other hitherto found in the Western Hemisphere, but various genera not very remotely related are known from the Oriental and Australian regions. It is perhaps most nearly allied to the minute insects composing the genus *Panelus* and is not unlike the recently described Ceylonese species *P. setosus*, Arrow (*Fauna Brit. India*, Col. Lamell. 3 : 406, fig. 56) in its general appearance and especially in the very peculiar form of the pronotum. The legs are stouter and the tibiae more flattened than in *Panelus* and the tarsi shorter, although with similarly proportioned joints *i.e.*, the fifth the longest and the preceding four almost equal. The minute front tarsi are a little shorter than the dilated extremities of the front tibiae. One of the most distinctive features of the genus is found in the form of the claw joint upon all the feet. This is compressed and rectangular in shape, the delicate claws being attached near the inner angle of the terminal edge and the outer angle produced into a moderately long sharp spine. Another noteworthy feature is the presence of a roundish depression on each side of the mesosternum and at its hind margin. These depressions appear to be usually filled with and partly concealed by a granular matter, probably a coagulated fluid exuded from internal glands through an orifice existing between the sternal plates. These organs are probably homologues of those found in a similar situation in two species of *Synapsis*, *S. ovalis*, Bouc., and *S. gilleti*, Arrow.

The pronotum is extremely convex and strongly depressed at the base, where it is relatively narrow, producing, with the similarly narrowed elytra at the shoulders, an unusual constriction of the body. The legs, with their long gradually dilated tibiae and the front tarsi reduced to the length of the apical edge of the front tibia, are similar to those of the Indian genus *Ponerotrogus*.

Pedaridium paranense, sp. n. (Fig. 2.)

Brunneo- vel purpureo-nigrum, opacum, breviter sat dense fulvo-setosum, ovale, capite antice emarginato, sat crebre punctato, pronoto minus crebre, elytris subtiliter striatis, interstitiis planis, minute seriato-punctatis; mesosterno grosse annulato-impresso, metasterno medio nitido, lateraliter strigoso-rugoso, abdominis segmentibus 4 basalibus medio fortiter angustatis, extus grosse striolatis, segmento 5° U-formi, grosse punctato, pygidio inflexo, ventrali.

Long. 6 mm.; lat. max. 3 mm.

S. Brazil : Castro, Paraná.

Four specimens have been kindly presented by Herr Luederwaldt to the British Museum.

I described three species of this genus in 1913, and besides these, only the type-species *P. hirsutum*, Har., is as yet recorded. The present form differs markedly from all four. It is larger, less shining and more closely hairy than the three formerly described by me, and smaller than *P. hirsutum*, with the clypeal teeth quite blunt, the pronotum not closely punctured, the elytra smooth without median depression and quite differently sculptured. The upper surface is quite dull, rather closely clothed with short yellow setae directed obliquely backwards, the head finely and rather closely punctured, the pronotum rather less closely, the elytra bearing fine simple striae and the intervals finely punctured in double rows. The conformation of the lower surface is

peculiar. It is very shining in the middle and very coarsely and closely sculptured at the sides. The mesosternum bears large, deeply impressed circles. The middle coxae are oblique and do not reach the middle of the metasternum. Only five abdominal sternites are visible, of which the basal four are very

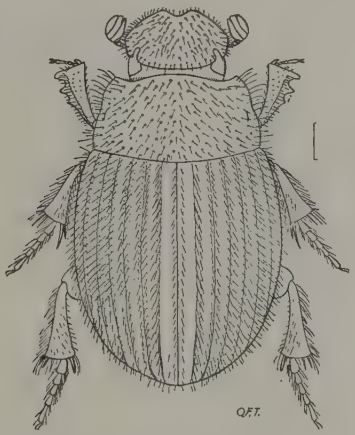


FIG. 2.—*Pedaridium paranense*, sp. n.

narrow in the middle and bear at the sides large transverse and concentrically disposed strioles. The last sternite is broad and U-shaped, decorated with large pits, the pygidium fitting into the posterior excavation. The antennal club is large.

Pedaridium quadridens, sp. n. (Fig. 3.)

Nigrum, vix nitidum, ubique setis erectis fulvis parum densis vestitum, antennis pedibusque ferrugineis; breviter ovale, capite sat crebre punctato, plano, margine antico

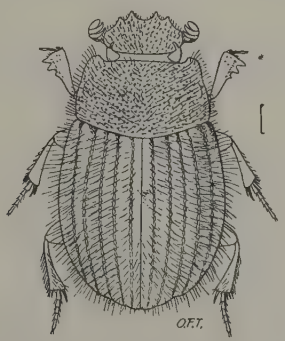


FIG. 3.—*Pedaridium quadridens.*

acute quadridentato, dentibus 2 internis remotioribus; pronoto fortiter et crebre punctato, lateribus fere rugose punctatis; elytris subtiliter catenato-striatis, intervallis planis, minute biseriato-punctatis; pygidio nitido, inaequaliter punctato; mesosterno metaster-

nique lateribus grosse annulatis, metasterni medio ubique sat minute punctato abdomineque rugose punctato.

Long. 4·5 mm.; lat. max. 2·5 mm.

ARGENTINA: Santa Elena, Entrerios (*G. E. Bryant*), Jan.

This is smaller and shorter than *P. paranense* and in size and general appearance resembles *P. cryptops*, Arr., but it is easily distinguishable by the four sharp clypeal teeth, the more closely and finely punctured pronotum and the elytral striae composed of annular punctures, united but not contiguous. The intervals contain double rows of punctures, which are much finer than those of *P. cryptops*. The tibiae are less broad than in the latter.

I know only a single specimen.

The known species of *Pedaridium* may be distinguished as follows:

Clypeus bearing acute teeth
  Clypeus armed with four teeth
    Pronotum densely punctured . . . . . *quadridens*, sp. n.
    ,, very sparsely punctured . . . . . *fulgens*, Arrow.
  Clypeus armed with two teeth
    Elytra not longitudinally impressed
      Striae simple . . . . . *argentinum*, Arrow.
      ,, chainlike . . . . . *cryptops*, Arrow.
    Elytra longitudinally impressed . . . . . *hirsutum*, Har.
Clypeus gently excised, not toothed . . . . . *paranense*, sp. n.

In a recent paper upon the allied genus *Trichillum* (1931, *Ann. Mag. Nat. Hist.* (10) **8**: 609) I stated that only two species of that genus had been previously described. I overlooked two species described by M. Boucomont in *Bull. Soc. ent. France*, **1928**: 187, 188, viz. *T. hirsutum* and *bradyporum*. The former appears to resemble *T. hystrix*, Arrow, but is larger and without a toothed clypeus. The latter occurred upon a living Sloth (*Bradypus*) in Central America.

NEW SPECIES OF *EXOCENTRUS*, MULSANT (COLEOPTERA: CERAMBYCIDAE: SUBFAMILY LAMIINAE)

By W. S. FISHER

(*Bureau of Entomology, United States Department of Agriculture.*)

AMONG a small collection of *Exocentrus*, Mulsant, received from the British Museum for identification, the following new species were found.

Exocentrus downingi, sp. n.

Female.—Above and beneath uniformly dark reddish-brown; each elytron densely clothed with dark brown pubescence, and ornamented on basal and apical thirds with white pubescence.

Head strongly transverse, feebly convex in front, slightly wider than pronotum at apex, flat between the antennal tubercles, which are feebly elevated and widely separated; surface with a vague, narrow, longitudinal groove extending from epistoma to occiput, finely, densely granulose, densely clothed with long, recumbent, whitish pubescence, with

a few long, erect, brown hairs intermixed; eyes large, deeply emarginate, separated from each other on the top by twice the width of the upper lobe. Antenna slightly longer than the body, uniformly dark reddish-brown, sparsely clothed with short, recumbent, brownish pubescence (whitish on basal joint), with a few long, erect hairs intermixed, densely ciliate beneath with long, erect, blackish hairs, and the joints broadly annulated at bases with white pubescence; first joint long, robust, cylindrical, slightly expanded at middle, extending to middle of pronotum; fourth joint slightly longer than the third joint, and subequal in length to the first.

Pronotum one and one-half times as wide as long, slightly narrower at base than at apex, and widest just behind the middle; sides feebly, arcuately expanded from apical angles to a small, acute tooth on each side just behind the middle (tooth short, slender, and pointing directly backward), then strongly, obliquely narrowed to the base; surface feebly convex, feebly, broadly, transversely depressed along the base, finely, densely granulose, sparsely, irregularly clothed with moderately long, recumbent, whitish pubescence, and with a few long, erect, blackish hairs intermixed. Scutellum broadly rounded at apex, and densely clothed with long, recumbent, whitish pubescence.

Elytra nearly four times as long as pronotum, and at base distinctly wider than pronotum at middle; sides parallel from base to apical third, then arcuately narrowed to the tips, which are separately, broadly rounded; disk moderately convex; surface finely, irregularly, rather densely punctate, the punctures nearly concealed by the pubescence, and becoming sparser toward the apices, densely clothed with rather short, recumbent, white and dark brown pubescence, the white pubescence covering the basal and apical thirds, with numerous small, irregularly distributed, brown spots intermixed, the spots somewhat confluent on apical third and forming two larger spots on each elytron near the sutural margin, the brown pubescence covering the median third, with a few indistinct, white pubescent spots intermixed, and with longitudinal rows of widely separated, long, erect, stiff, black hairs or setae.

Beneath feebly, finely, densely punctate, rather densely clothed with moderately long, recumbent, whitish pubescence, with numerous long, erect hairs on the legs; last abdominal segment strongly convex, broadly, arcuately emarginate at the apex, and with a feeble, narrow, longitudinal, median smooth carina.

Male.—Differs from the female in having the last abdominal segment feebly convex, and broadly rounded or subtruncate at the apex.

Length, 7 mm.; width, 2·6 mm.

Type locality. India: Nilgiri Hills.

Type. In British Museum. *Allotype.* In U.S. Nat. Mus., Washington.

Described from a male and a female (female type), which were collected at the type locality by A. K. Weld Downing.

This species resembles *ficicola*, Fisher, but it differs from that species in having the median third of the elytra densely clothed with dark brown pubescence, and the basal and apical thirds of the elytra clothed with white pubescence, with numerous small, brown pubescent spots intermixed.

Exocentrus aurivilliusi, sp. n.

Female.—Head and pronotum dark brown, the latter paler along the base and anterior margin; elytra pale brownish-yellow, each elytron ornamented with dark brown markings as follows: A narrow vitta along sutural margin behind the scutellum, a large, irregular spot along lateral margin at middle, and an irregular, elongate, oblique spot near apex; beneath brownish-yellow, with the legs (except middle of femora) paler.

Head strongly transverse, and feebly convex in front, subequal in width to the pronotum at apex, broadly concave between the antennal tubercles, which are rather strongly

elevated and widely separated; surface with a vague, narrow, longitudinal groove extending from epistoma to occiput, finely, densely granulose, rather densely clothed with moderately short, recumbent, yellowish pubescence; eyes large, deeply emarginate, and separated from each other on the top by two and one-half times the width of the upper lobe. Antenna nearly one and one-half times as long as the body, pale brownish-yellow, slightly darker toward tips of the joints, sparsely clothed with short, inconspicuous pubescence, and sparsely ciliate beneath with moderately long, erect, brownish hairs; first joint rather short, robust, cylindrical, expanded toward apex, extending to apical third of pronotum, and distinctly shorter than the third joint, which is slightly shorter than the fourth.

Pronotum one and one-half times as wide as long, vaguely narrower at base than at apex, and widest at middle; sides feebly, arcuately expanded, slightly more obliquely narrowed toward base, and armed on each side at middle with a short, acute tooth, which points slightly upward and almost directly backward; surface feebly convex, feebly, broadly, transversely depressed along base, densely, finely granulose, sparsely, irregularly clothed with moderately long, recumbent, yellowish pubescence. Scutellum broadly rounded at apex, and sparsely clothed with recumbent, yellowish pubescence.

Elytra nearly four times as long as pronotum, at base distinctly wider than pronotum at middle, and abruptly deflexed at the sides; sides parallel from base to apical third, then arcuately narrowed to the tips, which are separately, broadly rounded; disk moderately convex, broadly, transversely flattened basally; surface coarsely, densely, irregularly punctate basally, the punctures becoming sparser toward apices, rather densely clothed with long, recumbent, whitish pubescence on the pale areas, the pubescence dark brown on the dark areas, and with longitudinal rows of widely separated, long, erect, stiff, black hairs or setae; at the base of each seta the surface is glabrous, causing the surface to have a spotted appearance.

Beneath finely, densely punctate, and sparsely clothed with moderately long, recumbent, whitish pubescence; last abdominal segment strongly convex, and broadly, arcuately emarginate at the apex.

Length, 5·2 mm.; width, 1·8 mm.

Type locality. India: Nilgiri Hills.

Type. In British Museum. *Paratype.* In U.S. Nat. Mus., Washington.

Described from two females (one type), which were collected at the type locality by A. K. Weld Downing.

This species is separated from the other known species of this genus found in India in having a large, distinct, dark spot on each elytron along the lateral margin at the middle.

Exocentrus monticola, sp. n.

Female.—Above and beneath uniformly dark reddish-brown, and each elytron ornamented behind the middle with a dark, semicircular spot, enclosing a whitish pubescent spot, which extends to the lateral margin.

Head strongly transverse, and slightly convex in front, subequal in width to the pronotum at apex, vaguely depressed between the antennal tubercles, which are feebly elevated and widely separated; surface with a vague, narrow, longitudinal groove on the vertex and occiput, finely, but not very densely granulose, sparsely clothed with long, recumbent, yellowish-white pubescence, with a few long, erect, blackish hairs intermixed; eyes large, deeply emarginate, and separated from each other on the top by four times the width of the upper lobe. Antenna (broken) longer than the body, uniformly reddish-brown, sparsely clothed with short, recumbent and semierect, inconspicuous pubescence, sparsely ciliate beneath with long, erect, dark brown hairs, and the joints vaguely annulated

at bases with white pubescence; first joint long, robust, cylindrical, slightly expanded at middle, and extending to basal third of pronotum; third joint subequal in length to the first joint, and slightly longer than the fourth.

Pronotum one and one-half times as wide as long, slightly narrower at base than at apex, and widest just behind the middle; sides arcuately narrowed anteriorly, nearly parallel at middle, with a small, acute tooth on each side just behind the middle (tooth short, rather slender, and pointing slightly upward and almost directly backward), then strongly, obliquely narrowed to the base; surface feebly convex, feebly, broadly, transversely depressed along the base, finely, rather densely granulose, sparsely, irregularly clothed with long, recumbent, whitish and brownish pubescence, with a few long, erect hairs or setae intermixed. Scutellum broadly rounded at the apex, and densely clothed with long, recumbent, whitish pubescence.

Elytra nearly four times as long as pronotum, and at base distinctly wider than pronotum at middle; sides parallel from base to apical third, then arcuately narrowed to the tips, which are separately, broadly rounded; disk moderately convex, vaguely flattened basally; surface rather coarsely, densely, irregularly punctate basally, the punctures becoming sparser toward the apices, sparsely clothed with moderately long, recumbent, whitish pubescence, with numerous long, erect, stiff, black hairs or setae, and each elytron ornamented behind the middle with a large, semicircular, dark spot, enclosing a large, transverse, whitish pubescent spot, which extends to the lateral margin.

Beneath feebly, finely, densely punctate, rather densely clothed with moderately long, recumbent, whitish pubescence, with a few long, erect hairs on the legs; first abdominal segment strongly convex, and broadly, arcuately emarginate at the apex.

Length, 5 mm.; width, 1·8 mm.

Type locality. India: Nilgiri Hills.

Type. In British Museum.

Described from an unique female, which was collected at the type locality by A. K. Weld Downing.

This species resembles *pubescens*, Fisher, but it differs from that species in having the eyes more widely separated from each other on the top of the head, the black, erect setae on the elytra much coarser, and each elytron ornamented behind the middle with a large, semicircular, dark spot, enclosing a whitish pubescent spot.

Exocentrus pilosicornis, sp. n.

Male.—Above and beneath uniformly pale reddish-brown, and each elytron ornamented behind the middle with two elongate, dark brown spots, the spots separated by a narrow vitta of white pubescence, the sutural spot situated slightly in advance of the lateral spot.

Head strongly transverse and nearly flat in front, subequal in width to the pronotum at apex, vaguely depressed between the antennal tubercles, which are feebly elevated and widely separated; surface with a vague, narrow, longitudinal groove on vertex and occiput, finely, rather densely granulose, rather densely clothed with long, recumbent, yellowish-white pubescence, with a few long, erect, blackish hairs intermixed; eyes large, deeply emarginate, and separated from each other on the top by three times the width of the upper lobe. Antenna about one and one-fourth times as long as the body, uniformly brownish-yellow, sparsely clothed with short, recumbent, whitish pubescence, with numerous long, erect, dark brown hairs intermixed, sparsely ciliate beneath with long, erect, dark brown hairs, and the joints vaguely annulated at bases with white pubescence; first joint rather short, robust, cylindrical, slightly expanded at middle, and extending to middle of pronotum; third joint subequal in length to the first joint, and slightly longer than the fourth.

Pronotum one and one-half times as wide as long, slightly narrower at base than at apex, and widest at the middle; sides arcuately expanded from apical angles to a small, acute tooth on each side just behind the middle (the tooth rather short, slender, and pointing slightly upward and obliquely backward), then strongly, obliquely narrowed to the base; surface feebly convex, vaguely, broadly, transversely depressed along the base, finely, rather densely granulose, rather densely clothed with long, recumbent, whitish pubescence, with a few long, erect, black hairs or setae intermixed. Scutellum broadly rounded at the apex, and sparsely clothed with long, recumbent, whitish pubescence.

Elytra nearly four times as long as pronotum, and at base distinctly wider than pronotum at middle; sides parallel from base to apical third, then arcuately narrowed to the tips, which are conjointly, broadly rounded; disk moderately convex; surface rather densely, coarsely, irregularly punctate from bases to apices, rather densely, irregularly clothed with long, recumbent, whitish pubescence, forming more or less distinct, elongate markings, with numerous long, erect, moderately stiff, blackish hairs, and each elytron ornamented behind the middle with two elongate, dark brown spots, the spots separated by a narrow vitta of white pubescence, and the sutural spot situated slightly in advance of the lateral spot.

Beneath feebly, finely, densely punctate, sparsely clothed with long, recumbent, white pubescence, with numerous long, erect hairs on the legs; last abdominal segment feebly convex, and broadly subtruncate at the apex.

Length, 4·2 mm.; width, 1·8 mm.

Type locality. S. India: Kodai Kanal.

Type. In British Museum.

Described from an unique male from the E. A. Butler collection, which was collected at the type locality by T. V. Campbell.

This species is related to *pubescens*, Fisher, but it differs from that species in having the pronotum uniformly pale reddish-brown, the eyes more widely separated from each other on the top of the head, the white pubescence on the elytra forming more or less distinct, elongate markings, and each elytron ornamented behind the middle with two elongate, dark brown spots.

Exocentrus marginicollis, sp. n.

Male.—Above and beneath dark reddish-brown, the pronotum slightly paler along anterior and posterior margins, and the elytra irregularly variegated with small, whitish pubescent spots.

Head strongly transverse and feebly convex in front, subequal in width to the pronotum at apex, feebly, broadly depressed between the antennal tubercles, which are feebly elevated and widely separated; surface with a distinct, narrow, longitudinal groove extending from epistoma to occiput, finely, but not very densely granulose, rather densely clothed with long, recumbent, whitish pubescence, with a few long, erect, brown hairs intermixed; eyes large, deeply emarginate, and separated from each other on the top by one and one-half times the width of the upper lobe. Antenna slightly longer than the body, uniformly dark brown, sparsely clothed with short, recumbent, whitish pubescence, with numerous long, brown hairs intermixed, and rather densely ciliate beneath with long, erect, brown hairs; first joint long, robust, cylindrical, feebly expanded at middle, and extending to middle of pronotum; third joint slightly shorter than the first joint, and subequal in length to the fourth.

Pronotum one and one-half times as wide as long, slightly narrower at base than at apex, and widest just in front of the middle; sides strongly, obliquely expanded from apical angles to just in front of the middle, where they are nearly parallel or sinuate to a small, acute tooth on each side just behind the middle (the tooth rather long, broad, and

pointing obliquely backward), then strongly, arcuately narrowed to the base; surface feebly convex, flattened toward the sides, feebly, broadly, transversely depressed along the base and anterior margin, finely, but not very densely granulose, sparsely, irregularly clothed with rather long, recumbent, whitish pubescence, with a few long, erect, brown hairs intermixed. Scutellum broadly rounded at the apex, and sparsely clothed with long, recumbent, whitish pubescence.

Elytra nearly four times as long as the pronotum, and at base distinctly wider than the pronotum at middle; sides parallel from base to apical third, then arcuately narrowed to the tips, which are conjointly, broadly rounded; disk moderately convex; surface densely, coarsely, irregularly punctate from the bases to the apices, sparsely clothed with short, inconspicuous, brown pubescence, with numerous long, erect, stiff, blackish hairs or setae intermixed, and irregularly variegated with small, elongate, whitish pubescent spots.

Beneath feebly, finely, densely punctate, rather densely clothed with long, recumbent, whitish pubescence, with numerous long, erect hairs on the legs; last abdominal segment feebly convex, and broadly rounded or subtruncate at the apex.

Length, 3·4–4·4 mm.; width, 1·4–1·8 mm.

Type locality. Perak.
Other locality. Tenasserim: Tavoy.
Type. In British Museum. *Paratype.* In U.S. Nat. Mus., Washington.

Described from two males, both from the Fry collection, the type labelled "Perak, L. C. Doherty, 66950," and the paratype labelled "Tavoy, Tenasserim, Doherty, 62929." The paratype is much smaller and slightly paler than the type.

This species is related to *cudraniae*, Fisher, but it differs from that species in having the sides of the pronotum parallel at the middle, the elytra irregularly variegated with white pubescent spots, and without a conspicuous dark spot on each elytron behind the middle. It is also allied to *gardneri*, Fisher, but it differs from that species in having the pronotum widest in front of middle, and the elytra punctate from the bases to the apices, with the white pubescent spots smaller and narrower.

Exocentrus andamanensis, sp. n.

Female.—Above and beneath uniformly reddish-brown, anterior and posterior margins of pronotum slightly paler, and the elytra ornamented with longitudinal rows of slightly elongate, whitish pubescent spots.

Head strongly transverse and slightly convex in front, slightly wider than pronotum at apex, flat between the antennal tubercles, which are feebly elevated and widely separated; surface with a vague, narrow, longitudinal groove extending from epistoma to occiput, finely, densely granulose, sparsely clothed with long, recumbent, whitish pubescence, with a few long, erect, stiff, brown hairs intermixed; eyes large, deeply emarginate, and separated from each other on the top by one and one-half times the width of the upper lobe. Antennae broken, uniformly pale reddish-brown, sparsely clothed with short, recumbent, whitish pubescence, with numerous long, erect, stiff, brown hairs intermixed, moderately ciliate beneath with long, erect, brown hairs, but the joints not annulated at bases with white pubescence; first joint long, robust, cylindrical, expanded toward the apex, extending to middle of pronotum, and distinctly longer than the third joint, which is slightly longer than the fourth.

Pronotum one and one-half times as wide as long, slightly narrower at base than at apex, and widest along the middle; sides arcuately expanded from apical angles (nearly parallel at middle) to a rather large, acute tooth on each side just behind the middle (tooth

moderately long, broad, and pointing strongly upward and directly backward), then strongly, obliquely narrowed to the base; surface feebly convex, feebly, broadly, transversely depressed along anterior margin, narrowly transversely depressed along base, finely densely granulose, sparsely, rather uniformly clothed with long, recumbent, yellowish-white pubescence, with a few long, erect, stiff, black hairs or setae intermixed. Scutellum broadly rounded at apex, and rather densely clothed with long, recumbent, whitish pubescence.

Elytra four times as long as pronotum, and at base distinctly wider than pronotum at middle; sides parallel from base to apical fourth, then arcuately narrowed to the tips, which are separately, rather broadly rounded; disk moderately convex; surface coarsely, densely, irregularly punctate basally, the punctures becoming sparser near the apices, rather sparsely clothed with short, recumbent, brownish pubescence, with longitudinal rows of widely separated, long, erect, stiff, black hairs or setae, and each elytron ornamented with five or six longitudinal rows of small, irregularly distributed, narrow, slightly elongate, white pubescent spots.

Beneath rather densely, finely, vaguely punctate, and sparsely clothed with moderately long, recumbent, whitish pubescence, with numerous long, erect hairs on the legs; last abdominal segment strongly convex, broadly, arcuately emarginate at the apex, and with a feeble, narrow, longitudinal, median, smooth carina.

Male.—Differs from the female in having the last abdominal segment feebly convex, and broadly rounded or subtruncate at the apex.

Length, 5·4–6 mm.; width, 2–2·4 mm.

Type locality. Andaman Islands.

Other localities. Burma: Katha. Federated Malay States: Perak.

Type and paratypes. In British Museum. *Paratype.* In U.S. Nat. Mus.

Described from four examples, one female (type) and three males. The type labelled "Andaman Islands, 45525, Fry collection 1905. 100"; one paratype from the same locality, labelled "Atkinson collection, 92–3"; one paratype from the Fry collection, labelled "Perak, L.C., Doherty, 66949"; and the other paratype labelled "Mohnyin R., Katha, Burma, May 16, 1919, C. F. C. Beeson."

There is a slight variation in the specimens examined, and the examples from Perak and Burma are slightly darker in coloration than those from the type locality. The specimen from Burma has the pubescence on the pronotum more conspicuous, the pubescent spots on the elytra slightly broader and more or less confluent in the rows, and the black setae on the elytra are thicker.

This species is allied to *alboseriatus*, Gahan, but *alboseriatus* differs from *andamanensis*, Fisher, in having the head, pronotum and elytra pale reddish-yellow, legs and antennae piceous black, and the white pubescent spots on the elytra very small, round, and not elongate as in *andamanensis*.

THE INDIAN SPECIES OF *TIPULA* (DIPTERA, TIPULIDAE). PART II

By F. W. Edwards, M.A., Sc.D., F.E.S.

(*British Museum, Natural History.*)

Subgenus *Acutipula*, Alex.

A small subgenus of which I am acquainted with about a dozen Oriental species, four of which occur in India. These four are rather closely allied, and belong to the same group as the European *T. fulvipennis*, De Geer. They are best distinguished from other Indian species by the wings, which always have a more or less distinct dark cloud in the middle of cell *Cu* (as in *T. fulvipennis*); apart from this the wing-markings are not greatly developed, but there is a more or less conspicuous pale streak before the stigma, and the bases of cells M_1 and M_2 are usually pale. The Indian species all have the postnotum more or less densely pubescent, this being one of the points of difference from *T. fulvipennis*, in which the postnotum is almost bare.

T. (*A.*) *princeps*, Brun.

1912. *Tipula princeps*, Brunetti, Fauna Brit. Ind., Dipt. Nem.: 306.
1912. *Tipula fuscinervis*, Brunetti, Fauna Brit. Ind., Dipt. Nem.: 312.

Darjiling district. British Museum material is from Kurseong (*Fletcher*), Pashok (*F. H. Gravely*) and Mungpoo (*G. E. Shaw*).

The largest species of the group, wing-length 25–30 mm. Antennae alike in the two sexes, markedly shorter than thorax. Praescutum (as seen from behind, and if not discoloured) showing a pair of rather broad greyish lines between the three stripes, median stripe not obviously divided. Scutellum not in the least darkened on posterior margin. Postnotum distinctly darkened above, more ochreous on lateral and posterior margins. Scarcely a trace of darkening above base of halteres, pleurae almost uniformly ochreous. First abdominal tergite somewhat darkened posteriorly as well as laterally. Hypopygium of ♂ with terminal portion of tergite rather long, cleft at tip into two small lobes which are finely spinulose; outer style widened to before middle, then rapidly tapering to a rather sharp point; eighth sternite with dense yellow hairs posteriorly, hairs long towards each side, much shorter in middle.

T. (*A.*) *robusta*, Brun.

1911. *Tipula robusta*, Brunetti, Rec. Ind. Mus., **6**: 254.
1912. *Tipula nigrotibialis*, Brunetti, Fauna Brit. Ind., Dipt. Nem.: 324.
1918. *Tipula fumifascipennis*, Brunetti, Rec. Ind. Mus., **15**: 266.

Darjiling district. British Museum material includes the type of *T. robusta*, a cotype of *T. fumifascipennis*, and other specimens from Darjiling.

Differs from *T. princeps* in having the posterior margin of the scutellum rather conspicuously darker than the base; also in the more extended pale areas of the wing, the basal two-thirds of the upper basal cell being entirely pale, the pale band before the stigma much wider, and *m-cu* usually with pale borders. Hypopygium with outer style much wider than in *T. princeps*, not distinctly pointed; eighth sternite with a pair of small tufts of yellow hair, middle part of posterior margin bare.

T. (*A.*) *quadrinotata*, Brun.

1912. *Tipula quadrinotata*, Brunetti, Fauna Brit. Ind., Dipt. Nem. : 330.
1916. *Tipula shirakii*, Edwards, Ann. Mag. Nat. Hist. (8), **18** : 258.
1918. *Tipula fumicosta*, Brunetti, Rec. Ind. Mus., **15** : 266.

A widely distributed species occurring in Assam, Sikkim, Malay Peninsula, Borneo and Formosa.

Closely allied to *T. robusta*, but pale areas of wing not so extensive, scutellum more conspicuously dark brown posteriorly (the dark area sometimes divided into two spots); postnotum greyish-ochreous, not darkened above; a broad blackish streak from below wing-root to base of abdomen, passing above base of halteres. Hypopygium much as in *T. robusta*, but terminal portion of tergite rather more deeply cleft, lobes rather more spinulose, outer style still broader, more truncate at tip.

T. (*A.*) *interrupta*, Brun.

1911. *Tipula interrupta*, Brunetti, Rec. Ind. Mus., **6** : 256.

Type ♀ in British Museum from Darjiling (*Howlett*), also 1 ♂ from the same locality (*Brunetti*).

Brunetti's type female is now much discoloured, but appears to differ from *T. robusta* and *T. quadrinotata* in having no trace of darkening on the posterior margin of the scutellum, from *T. quadrinotata* in having no dark area above base of halteres, and from *T. princeps* in having no darkening of upper surface of postnotum nor of posterior margin of first abdominal tergite; it is also smaller than *T. princeps*, though with similar wings. The perfect male referred to above shows the same features and is almost certainly the male of *T. interrupta*; it has several other peculiarities, as follows :

Antennae somewhat longer than head and thorax together. Praescutal stripes not well defined, but median stripe double, inner margins of both inner and outer pairs darkened. Hypopygium with terminal portion of tergite short, broad, entire (as in *T. fulvipennis*), spinulose distally; outer style large and very broad (almost broader than long); eighth sternite almost bare, with only a few short, brownish-yellow hairs in middle of posterior margin, none laterally.

Subgenus *Indotipula*, Edw.

This subgenus is almost exclusively Oriental, one or two species extending into the Austro-Malayan region. It is distinguished primarily from all other subgenera by the reduction of the tibial spurs, the front tibia having no spur, the middle tibia a single very short spur or none, and the hind tibia usually two short spurs, occasionally one or none. Another distinctive feature is the great reduction of the axillary area of the wing, the vein *Ax* running rather close to and usually parallel with the wing-margin. All the species are of medium or rather small size, and without wing-markings other than a dark stigma; the vertex is always smooth and flat; the body of the male is shorter than the wing, but that of the female is longer, with a normal, horny ovipositor. The species are very similar and rather difficult to distinguish.

T. (*I.*) *walkeri*, Brun.

1848. *Tipula fulvipennis*, Walker, List Dipt. Brit. Mus., **1** : 67 (*nec* De Geer).
1911. *Tipula walkeri*, Brunetti, Rec. Ind. Mus., **6** : 246.
1912. *Tipula tenuipes*, Brunetti, Fauna Brit. Ind., Dipt. Nem. : 333.

Nepal; Assam. Represented in British Museum only by Walker's type.

Front and middle coxae more or less dark; indications of darker markings on lower part of pleurae; praescutum with three more or less fused, dark brown stripes, its sides and pleurae greyish-dusted; ♂ antennae not modified, flagellar segments slender, slightly concave above and slightly convex below; postnotum bare. Hypopygium with ninth tergite terminating in a pair of small processes which are somewhat pointed, blackened, and covered with rather numerous black spinules; outer style rather small, pale, tapering to a point; no hair-tufts. Wings broader than in the other Indian species, axillary area less reduced; membrane with slight yellowish tinge, stigma not very dark, no trace of whitish area at base of discal cell.

A representative species occurs in North Borneo.

T. (*I.*) *demarcata*, Brun.

1911. *Tipula demarcata*, Brunetti, Rec. Ind. Mus., **6**: 259.

Type in Indian Museum, a female from Kandy, Ceylon; British Museum material includes a male from Suduganga and a female from Emelina, Ceylon (*Senior-White*); a female from Trincomali, Ceylon (*Yerbury*); and a pair, apparently conspecific, from Suisha, Nanto, Formosa (*Shiraki*).

Very similar to *T. walkeri* in colouring, and hypopygium almost identical in structure, but perhaps distinct specifically by the narrower wings, with more reduced axillary area. Both the males examined have lost their antennae.

T. (*I.*) *cinctoterminalis*, Brun.

1912. *Tipula cinctoterminalis*, Brunetti, Fauna Brit. Ind., Dipt. Nem.: 338.

Type a female from Kurseong, E. Himalayas.

Apparently belongs to this subgenus, but needs re-description; may be the same as the following.

T. (*I.*) *elegantula*, Brun.

1912. *Tipula elegantula*, Brunetti, Fauna Brit. Ind., Dipt. Nem.: 338.

Cotypes from Mazbat, Assam; also recorded by Brunetti from other localities in Assam and South India, but the latter records probably refer to another allied species. British Museum material comprises one cotype male from Mazbat, one male from Shillong and one female from Cherrapunji, Assam (*Fletcher*).

Thorax almost uniformly light ochreous-brown; dorsum dull, without stripes; pleurae and coxae slightly paler, rather distinctly shining, without trace of grey dusting. Scutellum and postnotum bare. Wings with only a faint yellowish-brown tint, stigma light brown. Antennae of ♂ very slightly longer than head and thorax together; flagellar segments scarcely modified, very slightly enlarged beneath towards tips. Hypopygium with lobes of tergite blackened, rounded at tips, very finely spinulose distally; eighth and ninth sternites with rather dense yellow hair, on ninth tending to form a pair of tufts; outer style small, not pointed.

T. elegantula is evidently very closely related to *T. sinabangensis*, de Meij., 1915 (Sumatra) and *T. gedehicola*, Alex., 1915 (Java); possibly all three may be the same.

Tipula (Indotipula) palnica, sp. n.

Closely related to *T.* (*I.*) *sulaica*, Walk. (*leucopyga*, v.d.W.) (Malay Archipelago), which it resembles in its dark grey head with a darker median line; somewhat distinct

praescutal stripes (though the stripes are less obvious in ♂ than in ♀); greyish-dusted sides of praescutum and pleurae; bare scutellum with dark brown median line; bare postnotum; slightly brown-tinted wings with dark veins and stigma; and especially in the form of the ♂ antennae, which are about as long as the thorax, with most of the flagellar segments slightly concave above and with small basal and rather larger subapical enlargement beneath. Differs from *T. sulaica* chiefly in the ♂ hypopygium: lobes of tergite each divided into an inner portion bearing two small teeth and an outer portion which forms a strong black hook; ninth sternite produced distally into a small, ventrally directed tooth-like process; outer style much widened to beyond middle, then suddenly narrowed. Pleurae and coxae practically unmarked (in the type of *T. sulaica* the lower parts of the sternopleura and meron as well as the bases of the front and middle coxae are darkened). Spurs 0.0.2 or 0.1.2, the mid-tibial spur if present very minute.

Palni Hills, Kodai Kanal, 7000 ft., viii.1921, 2 ♂ 2 ♀ (*T. B. Fletcher*).

A damaged ♂ in the British Museum from Pundaluoya, Ceylon (*E. E. Green*) has a similar antenna and hypopygium, but differs in some details. The Chinese *T. suensoni*, Alex., also belongs to this group of species, but is apparently distinct.

Tipula (Indotipula) simlensis, sp. n.

Head dark grey with indistinctly darker median line. Rostrum ochreous, not distinctly darkened at sides. Antennae in ♂ slightly longer than head and thorax together, first three segments ochreous, rest dark; flagellar segments slender, slightly convex below and concave above. Antennae in ♀ rather shorter, flagellar segments light brownish with bases darkened. *Thorax* dull light ochreous; praescutum with three slightly darker stripes which are most obvious in front view, lateral stripes rather darker than median; scutellum bare, without dark line; postnotum bare; pleurae dull, unmarked. *Abdomen* in ♂ very short, with greatly enlarged hypopygium; eighth sternite very large and swollen, with a long median furrow dividing it into two lobes; ninth tergite also large, but less swollen than eighth sternite, the usual pair of spinulose apical lobes small and close together; outer style expanded in middle on posterior margin. Abdomen of ♀ long and slender as usual; brownish-ochreous, darker posteriorly, posterior and lateral margins of tergites, and whole eighth tergite, pale; base of ovipositor shining dark brown. *Legs* brownish, tips of femora rather indistinctly darker; spurs 0.0.2, outer spur of hind tibia very small. *Wings* with moderately strong brown tinge, veins and stigma not very dark, costal cell more yellowish as usual; a faintly clearer mark across base of discal cell. Venation normal for the subgenus; axillary area moderately narrow; stem of cell M_1 not extremely short. Halteres with dark brown knob.

Length of body, 10 mm. (♂)—16 mm. (♀); wing, 14–16 mm.

Simla, vii.1918, 4 ♂ 7 ♀ (*E. Brunetti*).

Allied to *T.* (*I.*) *elegantula*, Brun. (Assam), differing from that species as well as from all others of the subgenus *Indotipula* known to me in the enlarged hypopygium, especially the remarkably modified eighth sternite.

T. (*I.*) *divisa*, Brun.

1911. *Tipula divisa*, Brunetti, Rec. Ind. Mus., **6**: 261.

Type and one other ♂ in British Museum from Darjiling district; also 1 ♀ labelled "N. Ind."

Rostrum pale ochreous above, even at extreme base, but distinctly darkened at sides. Front with a dark grey transverse band as usual, and with indications of a darker median

line. Antennae of ♂ unmodified, scarcely longer than head and thorax together; flagellum entirely dark, bases of segments scarcely enlarged. Thorax almost uniformly ochreous, pleurae and sides of praescutum slightly paler; pleurae quite dull, but without grey dusting; scutellum and postnotum bare. Eighth abdominal tergite dark in both sexes. Wings more strongly tinted than in *T. elegantula*, with a faint pale mark over base of discal cell; stigma and costal cell somewhat darker brown, but stigma inconspicuous; veins M_1, M_2 and M_3 in both sexes with numerous though very short macrotrichia (this feature distinguishing *T. divisa* from most other species of the subgenus). Hypopygium with lobes of tergite small, rounded, without spinules, but inner basal portion of each forming a rectangular tooth; eighth sternite not specially hairy; ninth sternite with a double brush of short, curved, yellow hairs in the notch; outer style narrow, finger-like, pale.

T. (*I.*) *gracilis*, Brun.

1911. *Tipula gracilis*, Brunetti, Rec. Ind. Mus., **6**: 262.

Type and one other ♀ in British Museum from Darjiling (*Brunetti*).

Very similar to *T. divisa*, but differing in the following particulars: Rostrum not obviously darkened at sides, but with a small dark area at extreme base above (just below antennae); no trace of median dark line on front; scutellum with a few hairs; postnotum with a number of longish dark hairs on each side; pleurae slightly shining; stem of median fork still shorter. These differences, small as they are, probably indicate that the two species are distinct.

Tipula (Indotipula) tukvarensis, sp. n.

♂. Closely resembles *T. divisa*, Brun., differing chiefly as follows: Front with a small blackish spot adjacent to each eye. Rostrum not distinctly darkened at sides. First flagellar segment ochreous-brown instead of blackish like the remainder; next few segments with bases slightly enlarged. Veins M_1, M_2 and M_3 (as in most other species of the subgenus) with very few or no macrotrichia. Eighth abdominal tergite yellowish, contrasting with the sixth and seventh, which are dark brown. Hypopygium with lobes of tergite simply rounded, without tooth-like inner portion; small brushes of yellow hair at base of ninth tergite less developed; outer style blackish in colour, shorter and less narrow.

Sikkim: Tukvar, 4000 ft., x.1903, 1 ♂ (*F. A. Müller*).

It is possible that this may be the male of *T. cinctoterminalis*, Brun., which is also said to have an entirely pale eighth tergite, but the stigma is described as dark brown.

Subgenus *Formotipula*, Mats.

This again is a purely Oriental group, including about a dozen described species; all these have a short, thick body (shorter than the wings), and in the female sex a very short, fleshy ovipositor. The thorax is either wholly dull orange or wholly black. The broad wings are often more or less smoky, but never have any markings other than a dark stigma; axillary area larger than usual in *Tipula*, and extending basally distinctly beyond the arculus, though not to quite such an extent as in the genus *Ctenacroscelis*. Tibial spurs 1.1.2, all short (in all species examined).

The species may be arranged very readily in several groups according to the colour of the head (black or grey) and thorax (orange or black). Only two Indian species have hitherto been described, but several others are known in Indo-China (*pluto*, Brun., *sciariformis*, Brun., *hypopygialis*, Alex., *obliterata*, Alex., *melanopyga*, Edw., *laosica*, Edw.).

T. (*F.*) *rufoabdominalis*, Alex.

1927. *Tipula rufoabdominalis*, Alexander, Rec. Ind. Mus., **29**: 168.
1918. *Tipula rufiventris*, Brunetti, Rec. Ind. Mus., **15**: 268 (*nec* Macquart).

Recorded by Brunetti from Darjiling district and also from Garo Hills, Assam; British Museum material is from the latter locality (named by Brunetti) and from Shillong, Assam (*Fletcher*).

This is closely related to the sub-genotype (*T. holoserica*, Mats., of Formosa), which it resembles in having the head and thorax wholly velvet black and the abdomen mainly orange, differing in hypopygial characters. Brunetti has apparently made two errors in his description of the abdomen: "1st segment and base of 2nd black" should read "base or whole of first segment black," and "3rd, 4th and 5th segments mainly reddish" should read "second segment wholly, 3rd and 4th mainly reddish."

T. (*F.*) *melanomera*, Walk.

1848. *Tipula melanomera*, Walker, List Dipt. Brit. Mus., **1**: 68.

Recorded from Nepal and Upper Burma; a series in the British Museum from Assam.

Larger than *T. rufoabdominalis*, and readily distinguished by colour: head and tip of abdomen velvet-black; remainder of body dull orange.

Tipula (Formotipula) dikchuensis, sp. n.

♂. Allied to *T.* (*F.*) *melanomera*, Walk., which it resembles in having the head and hypopygium velvety black, thorax and first seven abdominal segments dull reddish orange, and vein R_2 complete. Differs from *T. melanomera*, Walk., and the allied *T. melanopyga*, Edw., chiefly in the hypopygium: ninth tergite with broad and deep V-shaped excavation, the two triangular portions nearly bare, with shining, pointed tips; coxites small, not prominent, without specially long hair; three pairs of pointed, inwardly-directed spines (two longer than the third and close together) on inner claspers.

Eastern Himalayas: Dikchu, Sikkim, 2500 ft., 22.iv.24, type ♂ (*Major R. W. G. Hingston*). Mungpoo, Darjiling district, 4500 ft., 13.iv.1920, 1 ♂ (*G. E. Shaw*).

Subgenus *Nippotipula*, Mats.

This subgenus includes a small number of Oriental, one Japanese and one North American species. It differs from all other subgenera of *Tipula* in having numerous soft erect hairs on the anepisternite (mesopleura) in addition to similar hairs on the sternopleura; the hairs on the mesonotum are also unusually numerous. Most species share a venational peculiarity, *m-cu* joining the discal cell well before the origin of M_4, but *T. phaedina* resembles an ordinary *Tipula* in having *m-cu* just touching the base of M_4. The species are all rather large, with conspicuous wing-markings; the antennae are always rather short and stout and alike in the two sexes. In the Japanese *T. coquilletti*, End., and in the allied North American *T. abdominalis*, Say, the abdomen is very elongate in both sexes and the legs rather long; the other species are of rather stouter build with rather shorter legs, the tarsi (at least in the female sex) being shorter than the tibiae.

Only one of the Indian species described by Brunetti belongs to this subgenus, but three others have since been obtained.

T. (*N.*) *pulcherrima*, Brun.

1912. *Tipula pulcherrima*, Brunetti, Fauna Brit. Ind., Dipt. Nem. : 310.

Recorded from Darjiling district, Garo Hills, and Bhowali. The British Museum possesses a specimen from the first-named locality.

Differs from the other Indian species of the subgenus in wing-markings; the tip of the wing is not uniformly darkened, but there is a dark subapical mark over the end of vein R_3, cell R_3 beyond this being mainly clear. A similar but distinct species (as yet undescribed) occurs in Borneo.

T. (*N.*) *phaedina* (Alex).

1927. *Brithura phaedina*, Alexander, Rec. Ind. Mus., **29** : 174.

Described from a male from Western China (Mt. Omei), and a female from Simla. The British Museum possesses a pair from Simla, viii.1918 (*E. Brunetti*) and a female from Shillong, Assam, 5000 ft., 7.vi.1924 (*T. B. Fletcher*). Concerning the Shillong specimen the collector notes : " At light, 11 p.m. Flies slowly with loud buzz like a bee."

T. phaedina is very distinct from the other species, not only in the venational character noted above, but also in the thoracic markings, each lobe of the scutum having two separate, round black spots.

T. (*N.*) *anastomosa*, Edw.

1928. *Tipula anastomosa*, Edwards, F.M.S. Mus. J., **14** : 132.

Type a female from the Malay Peninsula; other specimens of both sexes since received from that country, also a female from Shillong, Assam, iv.1924 (*T. B. Fletcher*), this last reared from a pupa found in moss under a stone.

The original diagnosis is short and inadequate, and does not mention one of the chief distinguishing features of the species, which is the presence on the mesonotum of three yellow lines, the median line slightly broader than the others, but all about equally distinct. The upper half of pleurae is rather conspicuously light buff, and the dorsal surface of the rostrum is wholly of the same colour.

Tipula (Nippotipula) susurrans, sp. n.

♀. *Head* mostly dark brown above, ochreous round eyes and above and below antennae. Rostrum blackish above as well as at sides. Antennae entirely light ochreous. *Thorax* mainly dark chocolate-brown above, with a narrow but conspicuous median yellow line extending whole length of praescutum and scutum; no other yellow lines. Sides of praescutum and upper part of pleurae ochreous, remainder of pleurae mainly dark brown, but with the sclerites outlined with pale; pleurotergite with a conspicuous pale greyish band adjoining the median furrow; an ochreous area extends from between middle and hind coxae to base of abdomen. Bands of hair on praescutum narrow; pleurae hairy as in other species of the subgenus. *Abdomen* long, with last few segments compressed, as in related species; segments 1–5 mainly orange above, blackish at sides, margins narrowly grey; 6–9 and cerci black. *Legs* with coxae dark brown; femora light brown, with a dark subterminal ring; tibiae and tarsi dark. Middle and hind tibiae with conspicuous black combs dorsally at tip, as in several other species of the subgenus. *Wings* with the ground-colour strongly smoky, variegated with blackish brown in region of stigma, over base of *Rs* and along *Cu*; stigma dark orange-brown, outlined with blackish; some small

creamy areas, the most conspicuous of which are before and beyond base of *Rs*, on arculus, and a small, outwardly oblique mark beyond stigma crossing cells R_1, R_2 and R_3. Halteres ochreous, a black spot at base of knob.

Length of body, 36 mm.; wing, 21 mm.

Assam: Shillong, 5000 ft., 24.v.24, 1 ♀.

This resembles *T. phaedina* (Alex.) in the black rostrum and in the colour of the abdomen and wings, differing conspicuously in the markings of the thorax, as well as in venation.

Subgenus *Brithura*, Edw.

Distinguished from all other subgenera of *Tipula* (and from most other Tipulinae) in having vein *Sc* 1 present and as well marked as *Sc* 2, a feature which was at first treated as of generic value. The two Indian species are large, stoutly-built insects superficially resembling members of the subgenus *Nippotipula* and with conspicuous wing-markings which suggest an affinity with *T. griseipennis*, Brun., and related species. The Chinese *T.* (*B.*) *fractistigma*, Alex., and *T.* (*B.*) *sancta*, Alex., are evidently closely allied to the sub-genotype, *T. imperfecta*.

T. (*B.*) *imperfecta*, Brun.

1913. *Tipula imperfecta*, Brunetti, Rec. Ind. Mus., **9**: 260.
1916. *Brithura conifrons*, Edwards, Ann. Mag. Nat. Hist. (8), **18**: 263.

Types from Darjiling and Formosa respectively. There is also a male in the British Museum from Simla, 24.vi.1918, at light (*E. Brunetti*).

Wings with pale marks in lower basal cell formed like the figures 80 joined together. Hypopygium of male only moderately large and wholly orange with orange hair.

T. (*B.*) *crassa*, Edw.

1916. *Brithura crassa*, Edwards, Ann. Mag. Nat. Hist. (8), **18**: 264.
1918. *Tipula gravelyi*, Brunetti, Rec. Ind. Mus., **15**: 264.

Type of *B. crassa* from an unknown Indian locality; of *T. gravelyi* from Darjiling. There is a male in the British Museum from Gangtok, Sikkim, 5000 ft., 27.v.1924 (*Maj. R. W. G. Hingston*).

Wings with the pale mark in lower basal cell like a V lying sideways, apex pointing towards base of wing; hypopygium of ♂ extremely large and swollen, dark brown.

A NEW SPECIES OF *TAPINELLA* (PSOCOPTERA)

By J. V. Pearman, F.E.S.

The genus *Tapinella*, Enderlein, 1908, was founded on a small Formosan Psocid with somewhat primitive but specialised venation differing only slightly from that of *Psylloneura*, Enderlein, 1903. A second species found by my wife is here described; it was running about on some Canary bananas purchased locally.

Tapinella castanea, sp. n.

Colour. Generally very deep red-brown (chestnut). Eyes reddish. Ocelli colourless. Legs, basal segments of antennae, and palpi lighter, more greyish-brown. Fore-wings transparent but strongly tinged grey-brown, the colour a little deeper in some of the cells in the middle of the wing, space between analis and axillaris pale, veins deep red-brown. Hind-wings paler, grey, position of analis indicated by a colourless line. Fore-wings iridescent bronzy-red and blue-green.

Morphology. ♀. Ciliation of head and body generally sparse and fine. *Head* large, epicranial suture distinct; ocelli arranged equidistantly in a triangle and separated by a space equal to their individual diameter; clypeus small; labrum small; maxillary palpi long, terminal segment with a group of blunt sensory spines on the outer side; mouth-parts of Liposcelid type; antennae (defective) of more than sixteen segments, flagellar segments fine, rod-like, the fifth and succeeding coarsely annulate medially, flagellum with a few fine

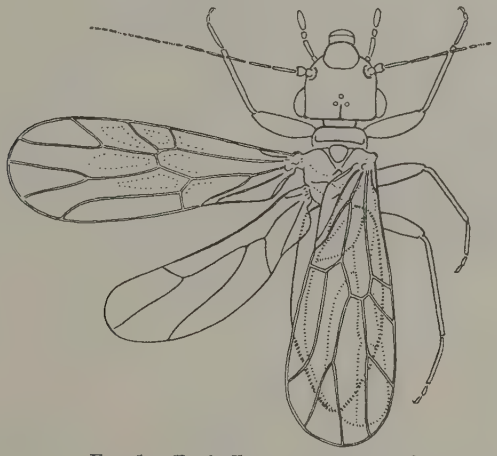


Fig. 1.—*Tapinella castanea,* sp. n. ♀.

bristles which are set on the outer side of F 1 and F 2, on both sides of F 3, and on the inner sides of succeeding segments; eyes set at hind head angles, projecting a little less than hemispherically, non-pubescent, a single cilia set on extreme hind margin of each. *Prothorax* simple, transverse; meso- and meta-thorax of the form usual in winged Psocids but relatively small and a little flattened above. *Abdomen* elongate, narrow, spindle-shaped; basal and two terminal tergites, telson and subgenital plate sclerised, otherwise membranous; suranal plate with numerous bristles, paraprocts with long fine cilia but without apical spurs or distinct sensefields; subgenital plate ovally acuminate, an inverted T-shaped, internal thickening before apex, very short bristles at apex and a group (longer) across disc. Three pairs of gonopods, all of lamellar form, anterior (gonopods of segment 8) and posterior (median gonopods of segment 9) ribbon-like, pointed, lateral gonopods a little fleshy, membranous, elongate ovoid, hairless. Sculpture (texture) of sclerised integument as in *Liposcelis.* *Legs* slender; hind coxae without stridulatory structures; femora of first pair a little stouter than others; basal segment of hind tarsus very long; fore and mid tibiae with one strong and two weak end spurs, hindmost with two strong and one weak; moderately long fine cilia on femora, short bristly hairs elsewhere; claw rather slender and

straight with a small pre-apical tooth. *Wings* extending only slightly beyond end of abdomen; venation as in genotype except that in the fore-wings the basal section of *sc* runs up into the costa; membrane closely set with bold, dark, rod-like microtrichia; fore-wing radial vein and marginal vein from base round nearly to cu_1 with widely spaced, short, fine cilia,* mostly discernible only under high magnification but between r_1 and m_1 longer and projecting slightly (at the extreme outer margin the cilia are transferred from the upper to the under side of the wing); hind-wing veins and margin bare except for one or two fine pale cilia at end of *m*. Colourless, isolated, crater-like sensoria occur on some veins, the most conspicuous being one at each lower angle of *PS*. In rest the wings are held flat upon one another above the abdomen, both left wings uppermost.

Length of fore-wing 1·3 mm.; of hind tibia 0·5 mm.; of hind tarsus I, 0·27 mm., II, 0·05 mm., III, 0·05 mm.

England: Bristol, 21.v.1932, 1 ♀, on Canary bananas (*Mrs. Pearman*).

Type, dissected, will be deposited in the British Museum.

No doubt introduced, but whether from the Canary Islands or elsewhere is problematical. Runs rapidly but rather jerkily. Distinguishable from *T. formosana*, Endln., which is rust yellow, by the darker colour, and by the different course of *sc* in fore-wing. In colour somewhat like *Psylloneura simbangana*, Endln., but differs from that species by the narrow hind-wings in which vein r_1 is wanting, that defect being a distinguishing feature of *Tapinella*.

Although the hind tarsal proportions and, to some extent, the venation, suggest kinship with the Psyllipsocidae, other features, notably mouth-parts, antennae, genitalia, and body sculpturing, as well as shape and resting position of wings, indicate unmistakably that the insect's affinities are with the Liposcelidae and in particular with the sub-family Pachytroctinae.

THE AFRICAN SPECIES OF THE GENUS *OECANTHUS*, SERV. (ORTH. GRYLLIDAE)

By L. Chopard.

The genus *Oecanthus* is one of the best characterised among the Gryllidae and deserves a special subfamily for its reception together with two other genera, viz. *Xabea*, Walk., and *Neoxabea*, Kirby, which are very closely related to it. All the species of *Oecanthus* inhabiting the Old World are so similar in habitus and general characters that a comprehensive description of the genus can be applied to any one of them. It seems unnecessary to give such a description here, as it can be found in any treatise on Orthoptera; besides, such is the special appearance of these Gryllids, that an Orthopterist cannot have the least doubt as to their generic determination. But this is not the case when one tries to separate the different species. In my opinion, there is no genus of Gryllids which presents such difficulties to the systematist. So great is the uniformity of the genus, that all the characters usually employed for discriminating species are useless here: the armature of the legs, the elytral venation, the male genitalia and the apex of the ovipositor, are nearly always so similar that the separation of the species is extraordinarily difficult and unreliable. This difficulty is still further increased by the fact that *Oecanthus* are extremely delicate insects, so that they are often in very bad condition in collections.

* About three or four times as long as the microtrichia.

Finally, it may be mentioned that the species of the genus *Oecanthus* seem to have a very wide geographical distribution. This may be due to the fact that they lay their eggs inside the twigs of different plants, and this habit probably facilitates the dissemination of the species.

Key to the species of Oecanthus.

Males.

1. Antennae black at base; posterior femora mottled with black; knees of the tibiae with a small black spot . . . . . *comptulus.*
   Antennae concolorous; posterior femora without any black markings, sometimes with small feeble brown spots; knees of the tibiae concolorous . . 2.
2. Elytral speculum one half longer than wide (figs. 8, 9) . . . . . 3.
   Elytral speculum a quarter or less longer than wide (figs. 1 to 6) . . . 4.
3. Posterior femora spotted with brown; pronotum long and narrow . . *macer.*
   Posterior femora unicolorous; pronotum not so long, wider behind *karschi*, sp. n.
4. Larger species (length of elytra 14 mm.) . . . . . 5.
   Smaller species (length of elytra 10–11 mm.) . . . . . 6.
5. Elytra with reddish markings; speculum narrower posteriorly (fig. 5) *rufopictus*, sp. n.
   Elytra wholly transparent; speculum wider posteriorly (fig. 6) *similis*, sp. n.
6. Posterior tibiae armed with 3 or 4 spines on each margin . . . *brevicauda.*
   Posterior tibiae armed with 6 or 7 spines on each margin . . . . . 7.
7. Elytral speculum wider (fig. 3) . . . . . 8.
   Elytral speculum narrower (figs. 1, 2) . . . . . *pellucens.*
8. Posterior femora shorter and less slender . . . . . *decorsei*, sp. n.
   Posterior femora longer and more slender . . . . . *burmeisteri.*

Females.

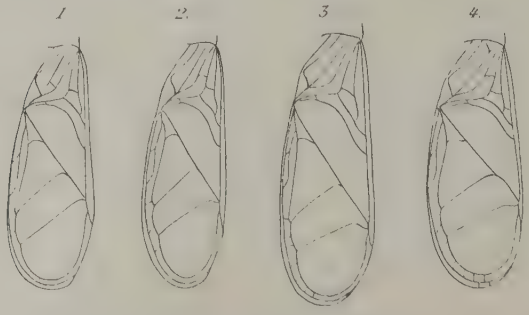
1. Antennae black at base . . . . . *comptulus.*
   Antennae concolorous . . . . . 2.
2. Elytra with straight, parallel veins . . . . . *rectinervis*, sp. n.
   Elytra with oblique, more or less diverging veins . . . . . 3.
3. Shape very slender, elongate; elytra with parallel margins, scarcely wider than pronotum at base . . . . . *macer.*
   Shape not so slender and narrow; elytra with feebly convex margins, their base wider than pronotum . . . . . 4.
4. Size very large (15–16 mm.) . . . . . *similis*, sp. n.
   Size medium (11–13 mm.) . . . . . 5.
5. Ovipositor very short (5–6 mm.); posterior tibiae armed with 3 or 4 spines on each margin . . . . . *brevicauda.*
   Ovipositor longer (8–9 mm.); posterior tibiae armed with 5 or 6 spines on each margin . . . . . 6.
6. Elytra with veins rather distant; transverse veinlets forming a nearly square reticulation . . . . . *decorsei*, sp. n.
   Elytra with veins closer; transverse veinlets forming a reticulation composed of area longer than wide . . . . . 7.
7. Subgenital plate wide, with sinuated margins, apex a little notched (fig. 10) *pellucens.*
   Subgenital plate narrower, with straight margins, apex subacute (fig. 11) *burmeisteri.*

1. *Oecanthus pellucens* (Scop.).

Gryllus pellucens, Scopoli, 1763, Ent. Carn., p. 32, no. 324.—*Oecanthus capensis*, Saussure, 1878, Mém. Soc. Genève, **25** : 456.—? *Oecanthus filiger*, Walker, 1871, Cat. Derm. Salt. B.M. **5** (suppl.) : 14.

Tunisia ; Algeria : Boufarik (P.M.) * ; Morocco : pays Braber, Riata ; Sarf el Akab (P.M.) ; Abyssinia : Muger Valley (*ca.* 5500 ft.) (B.M.) ; Uganda : Kamoni, Kampala, N.W. shore of Victoria Nyanza (B.M.) ;—Toro (P.M.) ; Moyen Chari : Dembraou-Boussou (P.M.) ; Kenya Colony (B.M.) ;—Mombasa, cratère du Longonot, Nairobi (P.M.), Fort-Hall ; Zambèze : vallée du Muza (P.M.) : Nyasaland : Zomba (B.M.) ; Mashonaland : Salisbury (B.M.) ; Chirinda (B.M.).

This species is widely spread nearly all over Africa, but seems less common than the following one in the western regions.



Figs. 1–4.—Right elytron of males of *Oecanthus* : 1. *pellucens*, from France (Le Rozier, Aveyron) ; 2. *pellucens*, from Uganda ; 3. *burmeisteri* ; 4. *brevicauda*.

O. capensis is certainly a mere synonym of *pellucens* as the characters given by Saussure have no specific value. *O. filiger* is very likely also a synonym of the present species ; there is absolutely no reason to put it in synonymy with *brevicauda* as Kirby did in his Catalogue.

Examples of *O. pellucens* from central Africa are a little larger than those from Southern Europe and their elytra are sometimes a little wider, making the differentiation from *burmeisteri* very difficult.

2. *Oecanthus burmeisteri*, Saussure, 1878, Mém. Soc. Genève, **25** : 454.

Uganda : Kampala, Entebbe, Bugishu (B.M.) ; Haut-Cavalla : pays Djolla (P.M.) ; French Guinea : région de Kouroussa (P.M.) ; Angl.-Egypt. Sudan : Lado (P.M.) ; Kenya Colony : Lake Naivasha, Burma Isle (B.M.) ; S.W. Africa : Okahandja (B.M.) ; S. Africa : Maritzburg ; Pondoland : Port St. John (B.M.) ; Cape Province : Ceres (B.M.).

This species is very close to the preceding one ; it is also widely spread in Africa, but does not occur north of the Sahara.

* The material studied belongs either to the British Museum (B.M.) or to the Paris Museum (P.M.) collections.

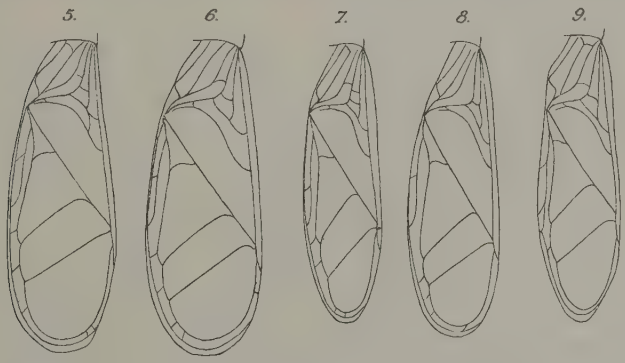
3. **Oecanthus decorsei**, sp. n.

Types : 1 ♂ Tchad sud, rives inondées; Mission Chari Tchad (*Dr. J. Decorse*), 1904;—1 ♀ Moyen Chari, Fort-Archambault; Mission Chari Tchad (*Dr. J. Decorse*), 1904 (P.M.).

Very close to *O. burmeisteri*, differing from it by the shorter and less slender posterior femora (1·6 × 7·5 instead of 1·3 × 8·0 mm.). In the male, the elytral venation is similar except the dividing vein of the speculum, which is parallel to the anterior margin and not divergent. The female is much less slender, with wider and shorter elytra, the veins being more distant and the areolae formed by the transverse veinlets nearly square. In both sexes the wings are only a little longer than the elytra.

Length of body : ♂ 13 mm., ♀ 11 mm.; length with elytra : ♂ 15 mm., ♀ 13 mm.; elytra : ♂ 10·5 mm., ♀ 10 mm.; post-femora : ♂ 8 mm., ♀ 7·5 mm.; ovipositor : 6 mm.

The male of this species is very difficult to separate both from *pellucens* and from *burmeisteri*, but is closer to the latter owing to the elytra being wider than is usual in *pellucens*. On the other hand, the female is readily distinguishable by its wider general shape and chiefly by the elytral venation. In *pellucens*,



Figs. 5–9.—Right elytron of males of *Oecanthus* : 5. *rufopictus* ; 6. *similis* ; 7. *comptulus* ; 8. *karschi* ; 9. *macer*.

as well as in *burmeisteri*, the veins are closer and the transverse veinlets form a reticulation composed of areolae that are distinctly longer than wide. The ovipositor is also shorter than in both the preceding species.

4. *Oecanthus brevicauda*, Saussure, 1878, Mém. Soc. Genève, **25 :** 454.
Oecanthus parvulus, Saussure, 1899, Abh. Senckenb. Ges., **21 :** 613.

Abyssinia : Muger Valley (5500 ft.) (B.M.); Uganda : Entebbe, Nakipuma, Kome Isle (B.M.); Sierra Leone : Njala, Jahama (B.M.); Congo : Ogooué (P.M.); Dahomey : Porto Novo (P.M.); Tanganyika Terr. : Kilimanjaro (P.M.); Kilosa (B.M.); Nyasaland : Zomba (B.M.); Mozambique (P.M.); Zululand : Eshowe (B.M.); Madagascar : Diego Suarez (P.M.).

This species is quite similar to *pellucens* in its general shape; besides the short ovipositor, the best character to distinguish it being the presence of 3 or 4 spines only on the margins of the posterior tibiae instead of 6 or 7. I consider *O. parvulus* as a small insular variety of *brevicauda*.

5. **Oecanthus rufopictus,** sp. n.

Type: 1 ♂, S. Africa: Pondoland, Port St. John (*R. E. Turner*), 5–30.iv.1923 (B.M.).

Size large. Antennae slightly darkened at base of external margin. Maxillary palpi with 5th joint only slightly longer than 4th. Pronotum rather strongly widening backwards. Anterior tibiae strongly dilated at base; posterior tibiae armed with 2 external, 3–4 internal spines. Elytra transparent, with a vinous reddish band along the internal margin and a spot of the same colour in the lateral field between the humeral and median veins; posterior part of elytra strongly widening; speculum large, divided a little above the middle by a vein which is parallel to the anterior margin. Wings caudate.

Length of body 15 mm.; length with wings 21 mm.; elytra 14 mm.

Pondoland: Port St. John; type (B.M.); Transvaal: Pretoria (B.M.); Mashonaland: Salisbury (B.M.); Nyasaland: Zomba (B.M.); Kenya Colony: Nairobi, Mombasa (P.M.); Uganda: Toro province (P.M.); Abyssinia: N. of Mount Chillalo (7500 ft.) (B.M.).

This species is, on an average, decidedly larger than the preceding ones. Specimens with the colour pattern well defined are easily recognisable; but this pattern is more or less obliterated in some examples, which are very difficult to separate from the following species.

One of the specimens in the British Museum collection, from Abyssinia, was labelled by Saussure himself as *capensis*, although its main features do not agree with the description of this species. As Saussure was the orthopterist who knew the Gryllidae best, this evident error shows how difficult is the determination of the species of *Oecanthus*.

I have found no female in the material which can be attributed to the present species.

6. **Oecanthus similis,** sp. n.

Types: 1 ♂, 1 ♀; Abyssinia: Mulu, above Muger Valley *ca.* 8000 feet (*Dr. H. Scott*), 18–23.xii.26 (B.M.).

♂. Extremely close to the preceding species, differing from it in having the elytra wholly transparent, the speculum being shorter and wider behind.

♀. Elytra with 3 free veins and 4 branches of the discoidal vein; all of them feebly oblique, rather regularly parallel to one another. Ovipositor longer than the cerci, extending to the apex of the wings.

Length of body 15 mm.; length with wings ♂ 20 mm., ♀ 22 mm.; elytra 14 mm.; ovipositor 10 mm.

Abyssinia: Mulu (type); Lake Źwai; Wambar Mariam; Djem Djem forest; Kuruman river (B.M.); Uganda: Entebbe (B.M.); S.E. Sudan: Didinga distr. (B.M.).

This species forms with the preceding one a complex somewhat similar to the *pellucens–burmeisteri* group, in which the extreme shapes only are readily distinguishable; between the typical specimens intermediate forms are often found the determination of which is difficult and sometimes uncertain.

7. **Oecanthus karschi,** sp. n.

Type: 1 ♂, S. Africa: Pondoland; Port St. John (*R. E. Turner*), 1–15.iv.24 (B.M.).

A rather large and elongate species. Elytra transparent, with the speculum 1·5 times as long as wide, its external margin very long, dividing vein much above the middle, slightly

diverging with the antero-internal margin. Anterior tibiae rather weakly dilated at base; posterior tibiae armed with 4-5 external, 6 internal spines. Wings a little longer than the elytra.

Length of body 13 mm.; length with elytra 16·5 mm.; elytra 13 mm.

Pondoland : Port St. John (B.M.); Uganda : Kampala (B.M.).

This species forms a link to the following one, being nearly as long but wider, with the speculum more rounded behind.

8. *Oecanthus macer*, Karsch, 1893, Ent. Nachr., **19** : 203.

Abyssinia : Buru (B.M.); Uganda : Ruwenzori (B.M.), 6800 ft., Kadunguru, Entebbe, Kampala, Busoga, Unyoro, Sipi (B.M.);—Unyoro (P.M.); Port. E. Africa (B.M.); Zambeze : vallée du Muza (P.M.).

This species is of the same size as *pellucens*, but differs from it in its much

Figs. 10–13.—Subgenital plate of female *Oecanthus* : 10. *pellucens* ; 11. *burmeisteri* ; 12. *macer* ; 13. *similis*.

more elongate general shape; in the male, the elytral speculum is not so wide behind.

9. *Oecanthus comptulus*, Karsch, 1893, Berlin. ent. Z., **38** : 161.

Uganda : Kampala (B.M.); Gold Coast : Sarpa (B.M.); Dar Banda : Fort-Sibut (P.M.).

This species was described from Adeli; it seems rather widely distributed in tropical Africa, but scarce. I have seen no female specimens of it, but, according to Karsch, they present the same very typical colouring of the antennae as the male.

10. **Oecanthus rectinervis,** sp. n.

Type : 1 ♀ French Congo : Haute-Sangha (*P. A. Ferrière*), 1897 (P.M.).

Same general shape as the other species of the genus; yellowish. Head presenting a brown band on the cheeks; occiput and forehead adorned with 3 slender yellow bands, lined with brown. Pronotum with a slightly projecting median line, tinged with brown on either side; disk a little pubescent, presenting a slight longitudinal elevation on each side. Abdomen brownish; subgenital plate rounded at apex. Ovipositor short, rather thick, its superior valves ending in 3 strongly hooked teeth. Anterior and median legs yellowish brown, pubescent; posterior legs wanting. Elytra very narrow, parallel, a little brownish, the veins being quite longitudinal and close, instead of being oblique and distant as in the other species of *Oecanthus*; dorsal field with 5 veins; lateral field rather low, the mediastinal vein bearing numerous branches. Wings a little longer than the elytra.

Length of body 8 mm.; elytra 9·5 mm.; ovipositor 4 mm.

This species is quite different from other *Oecanthus* by its elytral venation, which recalls that of a *Patiscus*; it might perhaps be made the type of a new genus when the male is known.

TWO NEW SPECIES OF ODONATA FROM JAVA

By M. A. Lieftinck

(*Buitenzorg Museum.*)

In drawing up a revised Catalogue of the Dragonflies of Java, in which it is proposed to include all those species which I have been able to find recorded as having occurred in the Island, I have come across several species which appear to be new to science. In order not to delay the publication of these striking novelties, it is proposed to offer here descriptions and outline-drawings of structural characters of two of the most remarkable discoveries of recent years.

A complete list of the species of Odonata occurring in Java and adjacent islands will, it is hoped, soon appear elsewhere. A detailed study of the biology of *Anaciaeschna montivagans*, described hereafter, will also be given in a separate memoir.

The types of the new species have been deposited in the Buitenzorg Museum collection.

Fam. Lestidae.

Platylestes heterostylus, sp. n. (figs. 1–2).

Material studied:—One ♂, adult, South W. Java; res. Banjoemas, Djeroeklegi, 28.i.1931 (*F. C. Drescher*). "Head and eyes dark brown. Thorax grass-green with black spots. Abdomen grass-green with black rings at articulations. Appendages white." (Living colours.)

Closely related to *platystylus*, Laidlaw (? *nec* Rambur).

Fig. 1.—*Platylestes heterostylus*, sp. n. Diagram of thoracic colour-pattern.

♂ (colours somewhat faded).—Labium yellowish. Labrum, anteclypeus and genae olive-green; postclypeus also green but with three indistinct brownish spots above. Ground-colour of head a dark olive-green, conspicuously marked with black in the centre and between antennae and the eye-margin. Small greenish spots around each lateral ocellus. Postocular lobes dark olive-green, decorated with cloudy black markings. Occiput clear greenish-yellow.

Pro- and syn-thorax olive-green above, pale greenish to ochreous on side and underneath. Prothorax with a median black spot at base of anterior lobe and a double fascia of the same colour over its middle.

Synthorax with a dark brown, somewhat triangular, spot along dorsal fifth of median carina, and with four series of black dots on either side of it, irregularly spread over the mesepisterna and the thoracic sides, as is shown in fig. 1.

Legs yellowish-green with two narrow, reddish-brown, stripes along exterior sides of femora, and with a similar brown stripe along inner and outer sides of tibiae. Spines, tarsal articulations and claws black.

Wings hyaline. Neuration in basal part reddish-brown, otherwise black in colour. Pterostigma short, a little inflated at the middle of its length, jet-black, its inner and outer margins narrowly white. The venation is almost wholly identical with that of the wings in a male specimen from Calcutta (India), photographed by Laidlaw (1920, *Rec. Ind. Mus.*, **19** : 156, fig. 4), except in a few points that may be tabulated as follows :—

1. The nervures *Ms* and M_3 are separated at their origin for a distance equal in length to the first cross-vein between them.
2. In hind-wing the nervure M_3 is at first straight, thence, after a distinct costad convexity at the level of the seventh postnodal cross-vein, is shallowly concave, and finally is again somewhat convex just before reaching the wing-margin.
3. The pterostigma of front wing is exactly one and a half times longer than wide, that of hind-wing being a shade longer. Inner and outer margins run parallel to each other in both pairs of wings.

Abdomen grass-green, with the articulations finely-black, and marked with warm dark cinnamon-brown as follows :—Segment 1 has a mid-dorsal marking of that colour and a

Fig. 2.—*Platylestes heterostylus*, sp. n. Male anal appendages, dorsal view and right side.

black point on the middle of the sides, the side-portion of articulation between first and second segment being likewise black. Segm. 2 has a dorsal brown marking, strongly constricted at middle, and an anterior and posterior pair of very small, diffuse, dark brown spots on either of the mid-dorsal carina; sides with a very distinct, oval, black dot situated beyond the middle of segment. Segm. 3–7 have cinnamon-brown markings covering the whole dorsum but strongly tapering in front and, after being gradually narrowed to behind, are suddenly and conspicuously widened before the end; the posterior figures thus formed

enclose a minute, transversely placed, black dorsal stripe, and are narrowly attached to the black articulation. The brown marking on dorsum of segm. 7 deepens gradually in colour to its apex, and 8–10 are dark blackish-brown; 8, 9 and 10 have an ochreous dorso-lateral spot about at their middle, and 8 has a comma-shaped yellow marking along side at base. Lower apical third to half of the tergites of segm. 7–9 black.

Anal appendages of very characteristic shape. Sup. apps. equal in length to segm. 8; basal fifth deep black, the rest of their length pale yellow; apices rather suddenly and strongly bent inwardly, the points covering one another. On the inner side, at the end of the first third of their length, is a blunt projection, and, slightly beyond this, there is a triangular cone, directed straight downwards; besides, at the end of the second third, the sup. apps. are provided with a sharply pointed tooth directed backwards and inwards. Inferior appendages brown at base, fading to yellow distally; over two-thirds the length of superiors, meeting each other apically but with the points knob-like and only scarcely upturned, not spatulate; each carries at its base on the inner side a tubercular projection for over one-third of its length (fig. 2).

Length: abd. + apps. 36, hind-wing 21·5, pt. $\frac{0{\cdot}9}{1{\cdot}0}$ mm.

The specimen is the holotype.

The genus *Platylestes*, Selys, heretofore containing only a single rare species, *platystylus* (Ramb.) in Bengal and Burma, has been thoroughly discussed by Laidlaw (*loc. cit.*, pp. 155–157, figs.), and, more recently, by Fraser (1930, *J. Bombay Nat. Hist. Soc.*, **34**: 92–94, figs.).

To the characters distinguishing the genus from *Lestes*, and enumerated by Laidlaw, I have nothing to add, the species described in this paper from Java agreeing very well in all important generic characters with the Indian species. According to Fraser, who described the supposed second known female of *platystylus* (taken in Bengal), his specimen differs considerably from the original description of the type as given by Rambur, so that it still remains an open question as to whether Laidlaw's and Fraser's insects are identical with the true *platystylus* or not. Only two males are known: one from Calcutta, the supposed allotype, and one from Burma.

The occurrence in Java of a second species may well be regarded as of exceptional interest, as its ranging so far south-eastwards means a welcome addition to our knowledge of the distribution of the genus. In all probability more representatives will be discovered sooner or later in the interjacent regions, although both species seem to be inconspicuous and very rare insects.

The principal differences between the males of *platystylus* and *heterostylus* may be given as follows:—

platystylus.	*heterostylus*.
1. Abdomen 33·5, hind-wing 21 mm.	1. Abdomen 36, hind-wing 21·5 mm.
2. Thorax palest khaki-brown above, milky-white on side. Venter powdered with white. Black spots along ventral margin of metepimerum apparently absent.	2. Thorax olive-green above, paler along sides (grass-green in living male), not pruinose below. Two additional black spots along ventral margin of metepimerum.
3. Pterostigma with costal side decidedly shorter than anal side, inner and outer margins divergent.	3. Pterostigma with costal side equal in length to anal side: hence inner and outer margins parallel to each other.

platystylus.	*heterostylus.*
4. Sup. anal apps. curling in at apices to meet each other in a gradual and regular curve, but the extreme apices curling a little outwards again. Inf. apps. half as long as upper pair, their distal half after a slight constriction a little widened, and gently curved inwardly towards apices, which are more spatulate at tip.	4. Sup. anal apps. less slender, with submedian interior acute tooth placed more distad, apical third of each rather abruptly inwardly bent and overlapping each other in a transverse plane, extreme apices thus curled distinctly inwards. Inf. apps. over two-thirds the length of upper pair, straight and slenderer, with tips rather club-shaped and rounded (fig. 2).

Fam. Aeschnidae.

Anaciaeschna montivagans, sp. n. (fig. 3).

Material studied :—5 ♂♂ and 8 ♀♀ from West and Mid Java.

Localities (imagines only). West Java :—1 ♀ (ad.), G. Tangkoeban Prahoe, 1400 m., 24.viii.1929 (*F. C. Drescher*); 2 ♀♀ (ad.), G. Gedeh-complex, Poentjak-pass, Telaga Saät, 1450 m., 15.xii.1929 and 30.iii.1930 (ovipositing) (*M. A. L.*); 4 ♂♂, 3 ♀♀ (reared from larvae), same locality, xi.1929, iii.1930, and viii.1930 (*M. A. L.*). Mid Java :—1 ♂ (freshly emerged), 2 ♀♀ (ad.), Diëng Plateau, Telaga Balekambang and Pengilon, and Kali Dolog, *ca.* 2500 m., 6 and 7.viii.1930 (*Miss T. van Benthem Jutting*).

Numerous larvae and exuviae from the above-mentioned localities and from G. Panggerango, 1200 m., G. Gegerbintang, 1800 m., and G. Papandajan, 1800–2400 m., in West Java.

A very darkly coloured species, stouter and larger than *jaspidea*, with head more projecting in front, thorax more robust, with male abdomen decidedly spindle-shaped, with male anal appendages quite different in shape, and with wings comparatively broader and more abruptly narrowed towards apices.

♂ (juv., bred).—Head very large, with eyes more globular and a little more flattened above than in *jaspidea*, and with the frons much more projecting, rather triangularly pointed in front. Labium, genae and mandible-bases dark brown. Labrum light to dark brown, narrowly bordered with black in the centre. Entire anterior surface of head pale brownish-olive (very probably vivid blue or green in the adult stage !) with the sutures unmarked. Fronto-clypeal suture with a very fine pale line. Frons in dorsal view with anterior edge obtuse-angulate, forming a very sharp ridge; dorsal surface concave, shining, transparent pale brownish-olive, with a very narrow and diffuse blackish shade along its base and with rather narrow, well delimited but isolated, somewhat crescent-shaped, antero-dorsal black border. Vertex and occipital triangle dark brown, the former very low, rounded, and with a very shallow incision at middle. Eyes cinnamon- to sepia-brown above (very likely also deep blue or green in adult male !).

Pro- and syn-thorax unicolorous pale purplish-brown, without any indication of dark sutures or pale coloured areas.

Legs black, all femora as far as the knees similar in colour to the thorax, almost identical in shape to *jaspidea*, tibial spines perhaps a shade shorter.

Wings broader and shorter than in *jaspidea*, apices more abruptly narrowed; hyaline. Neuration very dark brown with a vestige of a yellowish line along interior margin of costa. Pterostigma pale, shorter than in *jaspidea*. Membranula shaped exactly like *jaspidea*, but almost black instead of grey; only the extreme base of it is a little paler. Anal triangle three-celled. Anal loop a little longer in transverse direction but consisting of the ordinary number of cells (7–9). Neuration scarcely different from *jaspidea*; the distal course of the veins *Rspl* and *Mspl* decidedly more outcurved, M_3 distinctly more strongly curved to the

wing border and only two or three marginal cells between M_3 and *Mspl* in hind-wing (almost always four in *jaspidea*). The first and sixth—rarely the seventh—cross-vein in the antenodal space thickened. Antenodal cross-veins $\frac{16-18}{11-12}$, postnodals $\frac{9-10}{12-14}$.

Abdomen with basal segments more swollen in both dimensions, more abruptly narrowed towards end of segm. 2, and decidedly more strongly constricted before the middle of segm. 3 than in *jaspidea*. Instead of being gradually and very little widened from base of segm. 4 to end of 10, the intermediate segments in *montivagans* are more markedly enlarged from middle of segm. 3 to caudad, reaching its greatest width at the end of segm. 9, the sides of the tenth segment and the appendages being a little convergent, giving the abdomen its spindle-shaped appearance.

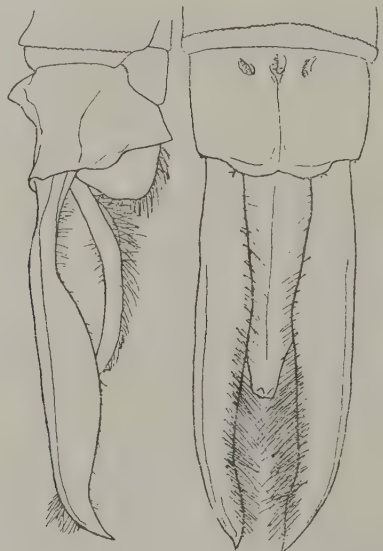


Fig. 3.—*Anaciaeschna montivagans*, sp. n. Male anal appendages, dorsal view and right side.

Coloration throughout dark reddish-brown, the tenth segment being a little paler and—in living adult examples—possibly at least partly greenish in colour. Auricles slightly longer and a little more prominent but similar in shape to *jaspidea*. All articulations broadly black, the supplementary transverse carinae, as also very short, paired, transverse lines behind the middle of segm. 3–8, finely lined with black. Distal border of segm. 10 black. Tergal margins unmarked. Sternites brown. Base of segm. 10 with a strong, tooth-like tubercle on the middle. Traces of supplementary longitudinal carinae along sides of segm. 6–8 only.

Anal appendages long and slender. Superior pair 6 mm. long, equal in length to half that of segm. 8 and segm. 9 + 10 taken together, shaped as is shown in fig. 3. Inferior appendage elongately triangular, concave and shining interiorly, reaching half the length of superiors. Coloration of both appendages pale reddish-brown, with apices and outer margins darkened.

♀ (adult, living colours, Telaga Saät).—Head shaped as in the male. Labium and genae dirty olive-brown. Labrum pale olive-green with a dark brown margin at middle of

anterior border. Clypeus dirty greenish-white, somewhat olivish intermingled with pale blue. Suture between clypeus and frons indicated by a fine pale brown line. Anterior surface of frons similar in colour, gradually passing to transparent brown along sides. Upper surface of frons concave, shining, transparent reddish-brown, darker especially along its base, but without indication of dark borders. Coloration at transition of vertical and dorsal portion of frons sharply limited and different. Eyes pearl-grey with deep blue gloom above, pearl-grey with a few darkly reflecting spots on side and underneath. Vertex dark reddish-brown in colour, as is also the occipital triangle. Occiput a little paler. Prothorax brown. Synthorax very dark velvet reddish-brown, tinted with olive-green on meso- and met-epimerum. Dorsum with two very large, broadly oval antehumeral bands of a fine, dark green colour, running almost parallel to one another, very gradually merging along their entire outline into the reddish-brown ground-colour, but distinctly separated from each other by the dorsal carina. Laterally, these bands are separated from the humeral suture by a distance of about 1 mm. and, dorsally, terminate at about 0·5 mm. before the antealar ridge, the N_2, the entire PN_2 and N_3, as also the spaces at extreme base of the wings, being clear grass-green in colour. There are, besides, three grass-green spots placed upon the under surfaces just before the wing-bases. Legs black, all femora, with the exception of the knees, very dark reddish-brown. Wings heavily and darkly tinged with deep golden brown, except in the costal space between base and first antenodal cross-vein, and in the cubital spaces. Pterostigma from light sepia-brown to dark reddish-brown, paler below. Neuration very similar to the male. Membranula unicolorous dark greyish-black. Nodal indices of five examples: $\frac{10.\,19.\,16.\,10}{12.\,13.\,12.\,12'}$ $\frac{10.\,15.\,16.\,10}{13.\,10.\,11.\,11'}$ $\frac{10.\,17.\,17.\,9}{13.\,11.\,13.\,13'}$ $\frac{9.\,17.\,17.\,10}{13.\,11.\,13.\,12'}$ $\frac{9.\,17.\,16.\,10}{13.\,11.\,11.\,12'}$.

Abdomen short and thick, cylindrical, widened at base, from base of segm. 3 to end of segm. 8 parallel-sided, constriction on middle of segm. 3 thus scarcely noticeable. Terminal segments a little widened in lateral, rather more in dorso-ventral dimension. Only the dorsal surfaces of first two segments marked with green, as follows:—posterior half of segm. 1 with ill-defined, transverse, grass-green bar; base of segm. 2 likewise and, added to this, with a single small, very badly delimited, triangular spot behind the transverse carina. Entire abdomen otherwise dark, warm reddish-brown, unicolorous, excepting the transverse carinae and the articulations of all segments, which are deep black. Traces of supplementary longitudinal carinae on segments 6 and 7. The abdomen is thus very similar in colouring to the thorax, though rather more reddish- than dark-brown, and not velvety in appearance.

Valves not different in shape from *jaspidea*, but anal appendages only 3 mm. long, much shorter and decidedly narrower than in that species; only a third longer than tenth abdominal segment, lanceolate, straight and flattened, slightly oblique with apices rounded and with a small tuft of dark brown hairs at tips.

Length: ♂ (raised) abd. + apps. 53, hind-wing 44–45, pt. 3·0–3·3 mm. ♀ (adult specimens only) 47–51, 44–45, 3 mm.

Type male and *allotype* female from Telaga Saät, iii.1930 (male bred), and 15.xii.1929 (female adult).

Unlike *A. jaspidea* (Burm.), which is a common plain species breeding in rice-fields and marshes, *A. montivagans* is restricted to the montane regions of Java, where it appears to be widely distributed. The larvae were found in weedy mountain-bogs and swampy lakes, the dull-coloured females being observed ovipositing in the soft stems of all kinds of semi-aquatic plants, such as *Polygonum javanicum* in Telaga Saät, Commelinaceae and Araceae in forest-pools.

The adult male has not yet been discovered, which lends some countenance to the idea that it may have crepuscular or nocturnal habits.

ZWEI NEUE *HARPALUS* (COL.) AUS DEM MAROKKANISCHEN ATLAS

Von Fritz van Emden (*Dresden*) und E. Schauberger (*Vöcklabruck*).

Unter einer grösseren, ihm zur Bestimmung vorgelegten Ausbeute aus Marokko, die Herr Dr. Otto Wohlberedt im Mai 1931 sammelte, stellte der Dresdener Autor zwei neue *Harpalus*-arten fest, von denen er nachfolgende Beschreibungen entwarf. Da ihm die verwandten Arten nur zum Teil in Natur bekannt waren und sich auch das Harpalinen-Material des Dresdener Museums gerade fast durchweg in Vöcklabruck befand, sandte er beide Arten und Beschreibungen zur Nachprüfung dorthin. Es ergab sich einerseits die Berechtigung der neuen Arten, anderseits aber durch den Vergleich der nächststehenden Formen eine nicht unbeträchtliche Anzahl Aenderungen und Ergänzungen im Text der Beschreibungen, die es dem Dresdener Autor wünschenswert erscheinen liessen, die gemeinsame Arbeit auch in der Ueberschrift des Aufsatzes zum Ausdruck zu bringen.

Tiergeographisch interessant ist der Nachweis einer Art aus der engeren Verwandtschaft des *Harpalus affinis*, Schrk. (= *aeneus*, F.) in Nord-Afrika.

Harpalus (Epiharpalus *) azrouanus, sp. n.

♂ Typus: Marokko: M. Atlas bei Azrou, 2000 m., Mai 1931 (*Wohlberedt*) (Mus. Dresden); ♀ Allotypus, Algerien: Djelfa, April–Mai 1930 (*Wohlberedt*) (Samml. Wohlberedt).—Kinn mit kräftigem Mittelzahn. Seitenrand des Halsschildes mit nur einer Borste, die kurz vor (Typus) oder in (Allotypus) der Mitte steht, die Scheibe abgesehen von der Mitte vor der ganzen Basis punktiert. In diesen Punkten stehen z.T. deutliche feine Härchen wie bei *H. aeneus* usw. 3 und 4 davon (nur spärlich) punktiert und behaart. Die Abdominalsternite jederseits ziemlich reichlich punktiert und behaart.—Scheibe des Halsschildes vorn glatt, kaum erkennbar (bei 30 facher Binokularvergrösserung) punktuliert, Seitenrand ziemlich stark gerundet, zur Basis mässig stark konvergierend, die Hinterecken mässig breit abgerundet. Flügeldecken mit abgerundeten Schultern, tief ausgebuchtetem Spitzenrand und schmal abgerundeter Spitze, die Ausbuchtung auch beim ♀ aussen ziemlich flach abgerundet, nicht durch einen vorspringenden Winkel begrenzt. Vorderschenkel des ♂ am vorderen Innenrande mit 6–7 langen Haarwimpern.

Schwarz, die Flügeldecken mit schwachem, violettem Schimmer, Fühler, Taster, die Randung des Halsschildes, die Tarsen und die Schienenwurzel rotbraun, die Wurzel des 2 und der folgenden Fühlerglieder beim Typus geschwärzt, beim Allotypus Beine und Fühler bis auf das helle Basalglied rotbraun. Flügeldecken beim ♀ matt glänzend, die Oberseite bei beiden Geschlechtern im übrigen mässig stark glänzend, die Flügeldecken beim ♂ deutlich mikroskopisch genetzt. Das ♂ $2\frac{2}{3}$, das ♀ $2\frac{1}{2}$ mal so lang wie in der Mitte der Flügeldecken breit. Halsschild kurz und breit, fast $1\frac{1}{2}$ mal so breit wie in der Mittellinie lang, beim Typus zu den ziemlich vorspringenden und schmäler abgerundeten Vorderecken ziemlich stark verengt, am Vorderrand ziemlich tief ausgerandet, die Seiten breit gerundet, zur Basis in sehr flachem Bogen verschmälert, diese knapp $\frac{1}{5}$ breiter als der Halsschild zwischen den Vorderecken, die Hinterecken mässig

* Die Schläfen des Typus zeigen auf der rechten Körperseite deutlich einige Härchen. Trotzdem ist naturlich nicht an eine Einreihung in die Gattung *Ophonus* zu denken.

breit abgerundet. Flügeldecken ziemlich tief gestreift, die Streifen nicht deutlich punktiert, die Zwischenräume sehr flach gewölbt, an der Basis und Spitze tragen auch die inneren Zwischenräume einige Punkte, im übrigen trägt der 6. Zwischenraum äusserst spärliche, der 7 spärliche, der 8 und 9 zahlreiche ziemlich grobe, Härchen tragende Punkte. Der 3. Zwischenraum beim ♂ hinter der Mitte mit einem eingestochenen Punkt.—Länge 9, 4 bezw. 9·0 mm.

Beim Paratypus ist die Ausbuchtung der Flügeldecken etwas flacher, der Halsschild zu den Hinterecken etwas stärker, zu den breiter gerundeten Vorderecken etwas weniger stark verengt, sein Vorderrand nur flach ausgerandet, und die Fühler und Beine sind einfarbig rotbraun. Vielleicht handelt es sich dabei um eine besondere Rasse des Sahara-Atlas, doch sehen wir von einer Benennung ab, da uns kein genügendes Material vorliegt.

Von *lethierryi*, Reiche 1860, *anisodactyliformis*, Solsky 1874 und *tjanschanicus*, A. Sem. 1889 unterscheidet sich *azrouanus* durch geringere Grösse und die vor den nur mässig breit abgerundeten Hinterecken in flachem Bogen verengten Halsschildseiten. Letztere sind bei jenen 3 Arten viel stärker gerundet und die Hinterecken breiter abgerundet. Von *aeneolus*, Rttr. 1900 und *aesculans*, Pant. 1888 weicht *azrouanus* durch die beim ♂ weniger stark glänzenden Flügeldecken ab, deren isodiametrische Mikroskulptur gröber und schon bei 35 facher Lupenvergrösserung zu erkennen ist. Ausserdem ist *azrouanus* viel flacher gewölbt als *aeneolus*, und seine Halsschildseiten sind in und vor der Mitte viel schwächer gerundet als bei dem grösseren *aesculans*, dem er im Habitus am nächsten steht. Der weit verbreitete und gemeine *H. affinis*, Schrk. 1781 (= *aeneus*, F. 1792), den das Staatliche Museum für Tierkunde zu Dresden auch mit der unverbürgten Angabe " Algeria, Mus. antiqu." besitzt, der aber sonst aus Afrika nicht nachgewiesen ist, ist gegenüber *azrouanus* durch den zur Basis viel gradliniger oder etwas ausgeschweift verengten, stärker queren Halsschild mit viel schwächer abgerundeten Hinterecken und den etwas tieferen, vor allem aussen etwas winkliger begrenzter Ausschnitt vor der Spitze der Flügeldecken zu erkennen. Der Penis des *H. azrouanus* ist dem des *aeneus* sehr ähnlich, nur sowohl in der Aussenansicht wie im Profil etwas allmählicher verjüngt. Der Apicalteil ist deutlich schmäler, nicht parallelseitig sondern deutlich zur Spitze convergierend, die Spitze (das Scheibchen) nicht winklig sondern im Bogen angesetzt, seitlich nicht vorstehend, auch im Profil mit der Hinterecke kaum (bei *aeneus* stark) über den Aussenrand vorragend. Wie bei *aeneus* nimmt das Scheibchen mehr als die Hälfte des Apicalteiles ein.

Harpalus wohlberedti, sp. n.

6 ♂ 2 ♀ Marokko : Azrou, M. Atlas, 1200 m., Mai 1931 (*Wohlberedt*). (3 ♂ 1 ♀ in Samml. Dr. Wohlberedt, 2 ♂ 1 ♀ im Staatlichen Museum für Tierkunde zu Dresden, 1 ♂ in Samml. Dr. E. Schauberger).—Halsschild nur in den Basalgruben punktiert sowie mit einigen Punkten unmittelbar neben dem Seitenrand, nach hinten stark verengt, die Seiten vor den schwach-stumpf-winkligen, an der Spitze sehr schmal abgerundeten oder etwas abgestumpften Hinterecken flach ausgeschweift, der Seitenrand mir nur einem borstentragenden Porenpunkt vor der Mitte, die Basis im ganzen Verlauf deutlich gerandet und wesentlich schmäler als die Basis der Flügeldecken. Schläfen hinter den Augen deutlich verengt. Kinn mit nur ganz schwacher Andeutung eines Mittelzahnes. Flügeldecken im 3. Zwischenraum mit dem normalen Porenpunkt im Spitzendrittel, je einer kurzen Punktreihe am Ende des 5 und 7. Zwischenraumes sowie der series umbilicata, die Zwischenräume im übrigen unpunktiert, die Schulter mit kleinem, spitzem

Zähnchen, Nahtspitze beim ♂ abgerundet, beim ♀ rechtwinklig bis leicht abgerundet. Die beiden vorletzten Abdominalsternite ausser den Borsten vor dem Hinterrand an der Basis nur mit einzelnen Härchen. Episternen der Hinterbrust auffallend lang, fast $1\frac{3}{4}$ mal so lang wie breit, nach hinten stark verschmälert und an beiden Seiten tief und vollständig gefurcht.

Kurz und gedrungen gebaut, $2\frac{1}{2}$ mal so lang wie in der Mitte der Flügeldecken breit, schwarz, die Flügeldecken meist mit deutlichem, violettem Schimmer, beim ♀ matt. Im übrigen stark glänzend. Das 1. Fühlerglied rötlichgelb, das 2 und die folgenden bis auf ihre Spitze rötlich pechbraun, diese Verdunkelung lässt gegen die letzten Glieder hin nach. Seitenrand und Hinterecken des Halsschildes mehr oder weniger braunrot durchscheinend. Schenkel und Schienen pechbraun, Tarsen rötlichbraun. Halsschild kurz und breit, volle $1\frac{1}{2}$ mal so breit wie in der Mittellinie lang, zur Basis stark verengt, wenn auch schwächer als zu den ziemlich vorstehenden Vorderecken, zwischen letzteren ziemlich tief ausgerandet, stark gewölbt und dadurch etwas dem *decipiens* (Dej.) Schaub. ähnlich. Flügeldecken kurz und breit, auf der Scheibe verhältnismässig flach gewölbt, der Basalrand gegen die Schultern nur sehr wenig gebogen und sehr wenig schräg. Die Streifung der Flügeldecken wie bei *rufitarsis*, doch etwas feiner. Penisspitze lang und schmal, vor dem Endscheibchen parallelseitig, auf der Innenseite mit kräftigen Sägezähnchen, das Scheibchen länglich-dreieckig, an der Spitze breit abgerundet, an der Basis tief und breit ausgebuchtet.—Länge 8–9 mm.

Die Art ist zunächst mit *rufitarsis*, Duft., 1812 verwandt, von dem ebenfalls ♀ Exemplare mit rechtwinkliger Nahtspitze vorkommen, sie unterscheidet sich von ihm durch etwas geringere Grösse, längere Episternen der Hinterbrust und schmäleren Apikalteil des Penis. In Schaubergers Tabelle (Col. Centralbl. **1 :** 38–41) könnte man sonst nur zu *bellieri*, Reiche 1861 kommen, indem man die Nahtspitze der Flügeldecken als abgerundet ansieht. Von diesem ist *wohlberedti* durch das dunkle 2. und stärkere Verdunklung der folgenden Fühlerglieder, die robustere Gestalt, geringere Grösse und die Ausrandung der Basis des Penis-Endscheibchens sehr verschieden. Die Penisformen dieser Gruppe wird Schauberger in einer besonderen Arbeit behandeln. Das Vorhandensein häutiger Flügel stellt ein weiteres Merkmal von *H. wohlberedti* gegenüber *alluaudi*, Ant. 1922, *wagneri*, Schb. 1926 und *nevadensis*, K. & J. Dan. 1898 dar.

THE AUSTRALIAN SPECIES OF THE GENUS *AULACOCYCLUS* (COL., PASSALIDAE)

By J. R. Dibb, F.E.S.

I have recently examined a large number of specimens belonging to the genus *Aulacocyclus*, and more especial attention has been focussed upon the Australian forms. Comparatively little systematic work appears to have been done in recent years upon the much neglected family Passalidae, and I do not think any apology will be needed for recording the following results. Some of the specimens which form the basis of this paper I have been enabled to examine through the kindness of Mr. G. J. Arrow of the British Museum, to whom I am very greatly indebted, not only for enabling me to see the British Museum material but also for valuable assistance in drawing up this paper. The remaining specimens are in the joint collection of myself and my colleague Mr. W. D. Hincks.

The genus *Aulacocyclus*, Kaup, has here been recognised as defined by Gravely (1918, *Mem. Ind. Mus.* **7**: 14).

Synonymy. The name *tereoides*, Kuwert, I have synonymised with *edentulus*, MacLeay, for the reasons stated below. Gravely (*l.c.*, p. 19) refers to *collaris*, Blackburn, presumably in error, as the name appears to be given as a reference to *errans*. Apart from the undermentioned Kuwertian names, *macleayi*, Kaup, is the only other of the known Australian species which I have been unable to recognise out of the material before me. According to Kaup's description it should be quite distinctive. The genus *Caulifer* was erected by Kaup to contain it, but under the present classification *Caulifer* falls naturally as a synonym to *Aulacocyclus*. In *macleayi* the supra-orbital ridges are said to extend backwards and join across the vertex, and in the middle where they join is a forwardly directed pointed ridge in front of which arises the central tubercle. The original record is from Sydney. As *macleayi*, Kaup, seems to me to be quite distinctive, I have included it in the table of species, the main reason for so doing being to make the key to the Australian species as complete as possible.

The Kuwertian species *foveipunctatus* and *rotundatoclypeatus*, in my opinion, will possibly sink as synonyms. Kuwert's description of *foveipunctatus* appears to me to agree well with *mastersi* of MacLeay. I can form no definite conclusion regarding *rotundatoclypeatus*, but the original description emphasises no very distinctive characters, and I am doubtful whether it has been recognised since originally described. These two latter points may require an examination of Kuwert's types before they can be satisfactorily cleared up.

Doubtful Australian Records. *Aulacocyclus perlatus*, Kaup, and *A. parryi*, Kaup, have not been included as Australian owing to the unsatisfactory state of Australian records available. The locality for *perlatus*, referred to as a variety of *parryi* in Kuwert's 1891 list, was given as Australia. In the same author's monograph of 1896 the Australian record is omitted and "New Guinea" substituted, *perlatus* being there raised to specific rank and the locus for *parryi* given as Moluccas. Subsequently *perlatus* has been recorded from New Guinea

and *parryi* from Ceram, Halmaheira, Ternate and Singapore. There is a specimen of *parryi* in the British Museum from St. Aignan and I have two specimens from Sudest Island (1932, Hincks, Stylops, **1**: 97, footnote).

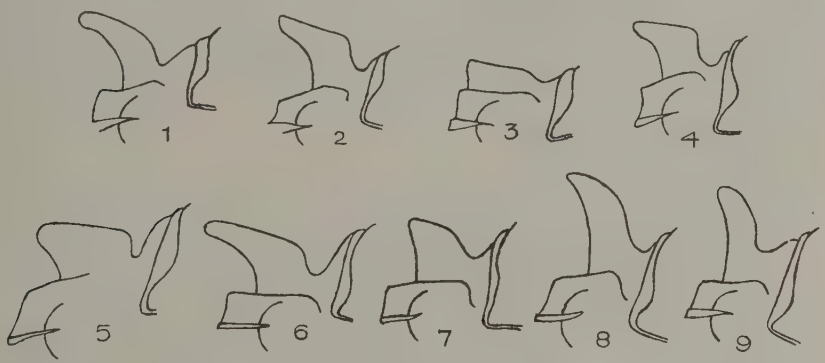
Kuwert's *fracticornis* is also omitted for similar reasons to the above. In Kuwert's 1891 list the locality is given as Südsee (Patria ?), and in 1897 in the same author's monograph, as Australia (?). Gravely in 1914 (who misquotes the name as *fratricornis*) gives for locality " ? South Sea Islands or Australia." I am doubtful whether this species has been recognised since it was originally described. Some definite Australian records are necessary before it can be included in the Australian fauna.

Table of Australian Species of Aulacocyclus.

1. Supra-orbital ridges joining posteriorly across vertex; thoracic scars narrow and irregular; elytra having distinct punctures in the lateral striae; fore tibiae broad. Length 27 mm. . . . . *macleayi.*
   Supra-orbital ridges posteriorly well separated . . . . . 2.
2. Lateral areas of metasternum very broad; large species; antennal lamellae rather short and thick; central tubercle elevated, strongly bent forward at an obtuse angle; anterior marginal furrow of thorax impunctate; dorsal striae of elytra shallow, impunctate, the outermost striae bearing feeble punctures. Length 35–40 mm. . . . . *teres.*
   Lateral areas of metasternum not very broad . . . . . 3.
3. Central tubercle much depressed, seen from above like a wide U-shaped ridge; supra-orbital ridges also somewhat depressed; antennal lamellae of medium length; thoracic scars small; dorsal striae of elytra indistinctly punctured, lateral striae shallower with punctures more obvious. Length 23–27 mm. . . . . *deyrollei.*
   Central tubercle not as above . . . . . 4.
4. Central tubercle having dorsal groove running from cleft apex towards base 5.
   Central tubercle without dorsal groove from cleft apex, tall, steeply inclined and gently curved forward, the anterior face being almost vertical; antennal lamellae long and slender; thoracic primary scars small, narrow and punctured, small secondary scars present; lateral areas of metasternum almost smooth; elytra rather short, dorsal striae deep, lateral striae less deep, punctures in grooves small but regular. Length 25 mm. *rosenbergii.*
5. Central tubercle somewhat depressed, short and stout, basal portion rising very little, apex blunt; antennal lamellae of medium length; thoracic scars deep and angular; lateral areas of metasternum finely rugose, dorsum of elytra impunctate, sides punctured in grooves. Length 23–28 mm. *mastersi.*
   Central tubercle more or less elevated or longer . . . . . 6.
6. Central tubercle abruptly bent forward to a nearly horizontal position . 7.
   Central tubercle not abruptly bent forward to a nearly horizontal position . 8.
7. Horizontal apical portion of central tubercle distinctly longer than upright basal portion; labrum deeply incised; antennal lamellae short; dorsal and lateral striae of elytra deep and very coarsely punctured. Length 27–29 mm. . . . . *kaupi.*
   Horizontal apical portion of central tubercle not appreciably longer than upright basal portion; vertex usually strongly punctured; anterior angles of thorax rather prominent, anterior marginal furrow much dilated and punctured; sutural striae of elytra more deeply impressed than lateral striae, all the grooves distinctly and evenly punctured. Length 22–28 mm. *errans.*

8. Antennal lamellae long . . . . . 9.
   Antennal lamellae short; central tubercle strongly elevated and more or less evenly curved forward, seen from above stalk-like with notched apex; lateral areas of metasternum finely rugose; striae of elytra deep and rather feebly punctulate. Length 23–30 mm. . . . . *edentulus.*
9. Punctures in elytral striae coarse and large; central tubercle steeply upright, almost vertical; thoracic scars simple in shape, deep and punctured; lateral areas of metasternum rugose. Length 20–22 mm. . . . . *collaris.*
   Punctures in elytral striae small but distinct; central tubercle rather short with anterior face almost vertical; thoracic scars narrow and punctured, secondary scars sometimes present; lateral areas of metasternum almost smooth; elytra deeply striated. Length 20–26 mm. . . . . *aliicornis.*

The text-figures represent in each case an enlarged lateral view of the central tubercle and supra-orbital ridge.



FIGS. 1–9.—1. *Aulacocyclus edentulus*, McL.; 2. *A. teres*, Perch.; 3. *A. deyrollei*, Kp.; 4. *A. errans*, Blkb.; 5. *A. mastersi*, McL.; 6. *A. kaupi*, McL.; 7. *A. aliicornis*, Kuw.; 8. *A. rosenbergii*, Kp.; 9. *A. collaris*, McL.

Aulacocyclus edentulus, MacLeay.

MacLeay, 1827, Cat. Insects coll. by Capt. King. Appdx., King's Survey, p. 439 (*Passalus*).
Percheron, 1841, Mag. Zool. Insectes, p. 39 (*Passalus*).
Burmeister, 1847, Handbuch der Entom., **5**: 515–516 (*Passalus*).
Smith, 1852, Nomenclat. Coleopt. Insects in coll. B.M. Pt. VI. p. 20 (*Passalus*).
Kaup, 1868, Prodr. **3**: 9.
Kaup, 1871, Berlin. ent. Z., **15** (Suppl.): 14–15.
Kuwert, 1891, Deuts. ent. Z., **1891**: 170.
Blackburn, 1896, New Gen. & sp. Austr. Coleopt., Trans. R. Soc. S. Austr., **20**: 233–234.
Kuwert, 1897, Nov. Zool., Tring, **4**: 280–282.
Gravely, 1914, Mem. Ind. Mus., **3**: 275.
Gravely, 1918, Mem. Ind. Mus., **7**: 19–20.
Dibb, 1932, Ent. Mon. Mag. **68**: 32.

cylindraceus, Percheron.

Percheron, 1835, Monogr. des Passales, pp. 103–104.

furcicornis, Boisduval.

Boisduval, 1835, Faune Entomologique. II. Voyage de l'Astrolabe, p. 242 (*Passalus*).
Montrouzier, 1855, Faune de l'Ile de Woodlark. Ann. Sci. Phys. Nat. Agric. Ind., **7** (1): 29 (*Passalus*).
Fauvel, 1862, Coleopt. de la Nouvelle Caledonie. Bull. Soc. linn. Normandie, **7**: 135 (*Passalus*).

terioides, Kuwert.

Kuwert, 1891, *l.c.*, p. 170 (*terioides*).
Kuwert, 1897, *l.c.*, p. 277 (*tereoides*).
Gravely, 1914, *l.c.*, p. 273.

Variation. Appears to be a common and rather widely distributed species also found in New Caledonia.

The central tubercle shows considerable variation in size and in the angle of inclination. The striation of the elytra appears to be almost constant, but the punctures in the dorsal grooves are nearly untraceable in two examples. The thoracic scars are not at all constant in form, and though usually crescentic, are occasionally comma-shaped.

Kuwert introduced the name *terioides* in his 1891 list (*tereoides* 1897) for those forms having a massive central tubercle with a somewhat deeper dorsal furrow than is typical, his description of 1897 being based upon a single specimen. The author adds that it is probably only a variety of *edentulus* and after examining a large number of specimens of *edentulus* which show enough variability to embrace the form *tereoides*, I do not hesitate to synonymise it. I have a specimen determined by Zang as *tereoides* and this falls naturally into the series of *edentulus*.

For further notes on variation see Dibb (*l.c.*).

Localities, etc.—

Coll. B.M. 5 exs., N.S. Wales: Jervis Bay (*F. A. Rodway*). 3 exs., N.S. Wales: Twofold Bay (*F. A. Rodway*). 2 exs., Queensland. 1 ex., N.S. Wales: Illawarra (*G. E. Bryant*). 1 ex., N. Queensland: Mackay (*D. S. North*). 1 ex., Victoria: Fitzroy River. 1 ex., Victoria: Gippsland (*H. Bodley*). 1 ex., Victoria (*Edwards*). 1 ex. (no locus) (*H. Swale*).

Coll. Hincks & Dibb. 5 exs., Australia (ex. coll. E. C. Horrell). 7 exs., N.S. Wales (via Staudinger). 6 exs., N.S. Wales: Parramatta (via Staudinger). 1 ex., N.S. Wales: Bathurst (ex coll. Benesh). 11 exs., Victoria (via Staudinger). 1 ex., Victoria: Alexandra (ex coll. Nodier). 2 exs., Queensland: Brisbane (ex coll. E. C. Horrell). 3 exs. (no locus) (via Staudinger).

Aulacocyclus teres, Percheron.

Percheron, 1841, Mag. Zool. Insectes, pp. 39–40 (*Passalus*).
Burmeister, 1847, Handbuch der Entom., **5**: 515 (*Passalus*).
Smith, 1852, Nomenclat. Coleopt. Insects in coll. B.M. Pt. VI. p. 19 (*Passalus*).
Redtenbacher, 1867, Zool. II. Coleoptera, p. 50 (*Passalus*).
Kaup, 1868, Prodr. **3**: 9.
Kaup, 1871, Berlin. ent. Z., **15** (Suppl.): 15–16.
Kuwert, 1891, Deuts. ent. Z., **1891**: 170.
Kuwert, 1897, Nov. Zool., Tring, **3**: 277.
Gravely, 1914, Mem. Ind. Mus., **3**: 273.
Gravely, 1918, Mem. Ind. Mus., **7**: 19–20.
Tillyard, 1926, Insects of Austr. & N.Z. (pl. 18, fig. 27).

Variation. This is a most distinctive species owing to its large size (the largest species in the genus) and the very wide lateral areas to the metasternum. There is little variation in the few specimens I have seen, the only evidence being confined to slight differences in the form of the central tubercle and in the extent of the puncturation of the metasternum.

Localities, etc.—
Coll. B.M. 1 ex., N.S. Wales (*H. J. Carter*).
Coll. Hincks & Dibb. 2 exs., Australia (ex coll. E. C. Horrell), 1 ex., Queensland: Townsville (via Janson).

Aulacocyclus deyrollei, Kaup.

Kaup, 1868, Prodr. **3**: 7.
Kaup, 1871, Berlin. ent. Z., **15** (Suppl.): 20 (*Taeniocerus*).
Kuwert, 1891, Deuts. ent. Z., **1891**: 170 (*Taeniocerus*).
Kuwert, 1897, Nov. Zool., Tring, **3**: 275 (*Taeniocerus*).
Arrow, 1907, Contrib. Class. Coleopt. Fam. Passalidae. Trans. Ent. Soc. Lond., **1907**: 447 (*Taeniocerus*).
Gravely, 1914, Mem. Ind. Mus., **3**: 272 & 331.
Gravely, 1918, Mem. Ind. Mus., **7**: 19–20.

Variation. The striation and puncturation of the elytra vary considerably. In one example the dorsal striae are extremely shallow and distinctly punctured. The puncturation of the under-surface is also variable in extent. This species is quite easily separated from the other Australian forms of the genus by the wide U-shaped ridge on the dorsal surface of the depressed central tubercle.

Localities, etc.—
Coll. Hincks & Dibb. 3 exs., Victoria: Ballarat District (ex coll. E. C. Horrell).

The species has also been recorded from Queensland, Port Denison.

Aulacocyclus errans, Blackburn.

Blackburn, 1896, New Gen. & sp. Austr. Coleopt., Trans. R. Soc. S. Austr., **20**: 233.
Gravely, 1914, Mem. Ind. Mus., **3**: 275.
Gravely, 1918, Mem. Ind. Mus., **7**: 19–20.
Dibb, 1932, Ent. Mon. Mag., **68**: 32–33.

Variation. Appears to be a common and very variable species. Gravely (1918, *l.c.*) considered that two forms, a large and a small form, occurred in this species. Some of the specimens before me, however, are intermediate between the sizes given by Gravely, and I have little doubt that when an extensive series is brought together there will be no wide separation between the sizes.

Puncturation of head varies to a considerable extent, the smaller specimens usually bearing apparently larger punctures. Groove on central plate of mentum sometimes wanting or very feeble. Thoracic scars may be comma-shaped or constricted in middle, appearing quite different from the typical form. Striation and puncturation of elytra appears to be remarkably constant. For further notes on variation in *errans* see Dibb (*l.c.*).

The species is evidently very closely related to *kaupi*, MacLeay, and is probably synonymous with it. The form *kaupi* seems to be of a larger average size with longer central tubercle and very deeply punctured elytral grooves.

Localities, etc.—
Coll. B.M. 2 exs., N. Queensland: Kuranda (*G. E. Bryant*). 1 ex., Queensland: Simon. 1 ex., N. Queensland: Malanda (*G. F. Hill*). 1 ex., N. Queensland. 1 ex., N.S. Wales: Richmond River. 1 ex., W. Australia: Kalgan River (*Nevinson*).
Coll. Hincks & Dibb. 5 exs., N.S. Wales (via Staudinger). 2 exs., Queensland (via Staudinger). 2 exs., Australia (ex coll. E. C. Horrell). 2 exs. (no locus) (ex coll. E. C. Horrell).

Aulacocyclus mastersi, MacLeay.

MacLeay, 1873, Notes on Insects from Gayndah. Coleopt. Pt. III. Trans. Ent. Soc. N.S.W., **2**: 174 (*Taeniocerus*).
Kuwert, 1891, Deuts. ent. Z., **1891**: 170 (*Taeniocerus mastersii*).
Kuwert, 1897, Nov. Zool., Tring, **3**: 275 (*Taeniocerus*).
Gravely, 1918, Mem. Ind. Mus., **7**: 19.

Variation. I find *mastersi* to be one of the most variable species of the genus, and it would appear that more than one form of this seemingly common species has been specifically named. I have examined over forty examples, and the extreme forms exhibit minor differences which make them appear very different from the typical form. The variable characters are mainly as follows.

Length of antennal lamellae not constant. Central notch of mentum, which is formed by two ridges projecting over the anterior margin, sometimes scarcely traceable. The central tubercle may be in an upwardly inclined position towards the apex. The small lateral patches of punctures on the scutellum not always distinct. The dorsal grooves of the elytra occasionally bear faint traces of punctures. A suggestion of a spur on the hind tibiae sometimes occurs in the form of a slight swelling.

The insect is of slender form and the central tubercle is always rather short with very blunt apex. It appears to be closely related to *deyrollei*, from which it differs mainly in the form of the central tubercle.

Localities, etc.—

Coll. B.M. 14 exs., Victoria: Fitzroy River. 2 exs., Victoria (*Edwards*). 1 ex., N.S. Wales: Ourimbah (*G. E. Bryant*).

Coll. Hincks & Dibb. 5 exs., Australia (ex coll. Nodier). 2 exs., Australia (ex coll. E. C. Horrell). 7 exs., N.S. Wales: Sydney (via Staudinger). 1 ex., N.S. Wales (ex coll. E. C. Horrell). 10 exs. (no locus) (via Staudinger).

Aulacocyclus kaupi, MacLeay.

MacLeay, 1873, Trans. Ent. Soc. N.S.W., **2**: 173.
Kuwert, 1891, Deuts. ent. Z., **1891**: 170.
Blackburn, 1896, Trans. R. Soc. S. Austr., **20**: 234.
Kuwert, 1897, Nov. Zool., Tring, **3**: 280–282.
Gravely, 1914, Mem. Ind. Mus., **3**: 275.

Remarks. I have not enough specimens before me to show the extent of variation in this species, but, as referred to above, I think it probable that it will embrace the form at present known as *errans*, Blackburn.

It appears to be rather closely related to *edentulus*; the central tubercle is, however, more horizontal, and the punctures in the grooves of the elytra more distinct.

Localities, etc.—

Coll. B.M. 1 ex., Queensland.

Coll. Hincks & Dibb. 1 ex., Queensland: Townsville (via Staudinger). 1 ex., ? Queensland (ex coll. E. C. Horrell).

Aulacocyclus aliicornis, Kuwert.

Kuwert, 1897, Nov. Zool., Tring, **3**: 278.
Gravely, 1914, Mem. Ind. Mus., **3**: 273.

ab. *sulcatipons*, Kuwert.

Kuwert, 1897, *l.c.*, p. 279.
Zang, 1905, Passalidarum Synonymia. Notes Leyden Mus., **25**: 230.
Gravely, 1914, *l.c.*, p. 273.

Variation. This species is apparently closely related to *rosenbergii*, Kaup, and the main features which distinguish it from its congeners are the

long antennal lamellae, the almost vertical anterior face of the central tubercle, and the straight or convex anterior margin of the clypeus.

I have seen three specimens only, two of which are in the British Museum collection. They are all very constant in form. I am very doubtful whether the species should be considered distinct from *rosenbergii*. In *aliicornis* the clypeus is convex and the antennal lamellae possibly not so long as in *rosenbergii*. I have treated the two species as separate, at least until more material is forthcoming.

Localities, etc.—
Coll. B.M. 1 ex., Nov. Holl. Bor. 1 ex., Queensland : Toowoomba.
Coll. Hincks & Dibb. 1 ex., Queensland : Toowoomba (via Janson).

Aulacocyclus rosenbergii, Kaup.

Kaup, 1868, Prodr., **3** : 7–8.
Kaup, 1871, Berlin. ent. Z., **15** (Suppl.) : 16.
Kuwert, 1891, Deuts. ent. Z., **1891** : 170.
Blackburn, 1896, Trans. R. Soc. S. Austr., **20** : 234.
Kuwert, 1897, Nov. Zool., Tring, **3** : 279–282 (*rosenbergi*).
Zang, 1903, Deuts. ent. Z., **1903** : 419.
Gravely, 1914, Mem. Ind. Mus., **3** : 274, 319.

percheroni, Kaup.

Kaup, 1868, *l.c.*, p. 8.
Kaup, 1871, *l.c.*, p. 16.
Blackburn, 1896, *l.c.*, p. 234.
Gravely, 1914, *l.c.*, p. 274.

Remarks. I have examined one specimen only, which is in the British Museum collection. The species can be distinguished from all other Australian species of the genus (excepting *aliicornis*—see remarks above) by the very long antennal lamellae combined with the absence of a dorsal groove on the upper surface of the central tubercle, and the concave anterior margin of the clypeus.

The locality of the specimen before me is " Nov. Holl. Occid."

The evidence of geographical distribution points to the probability that two species are at present included under the name *rosenbergii*. Kaup (1868, *l.c.*, p. 7) first described *rosenbergii*, giving for locality Nias. He also described the species *percheroni* (1868, *l.c.*, p. 8) from Australia. In the same author's monograph (1871, *l.c.*, p. 16) he relegated *percheroni* to the position of a synonym of *rosenbergii* and for localities Nias and Australia are given. The position has been left unaltered by subsequent authors, and until further material from the two localities mentioned has been examined the only course is to use the name *rosenbergii*.

Gravely (1914, *l.c.*, p. 274) suggests that the reason Kaup synonymised *percheroni* with *rosenbergii* was possibly to reduce the number of species of *Aulacocyclus* to five in order to conform to the peculiar classification he used. It seems highly probable that this was the case.

Aulacocyclus collaris, Blackburn.

Blackburn, 1896, Trans. R. Soc. S. Austr., **20** : 233–234.
Gravely, 1914, Mem. Ind. Mus., **3** : 275.

Remarks. The single specimen I have seen is Blackburn's type in the British Museum. It is apparently related to *errans*; the central tubercle is, however, not sharply bent forward but is almost vertical, and the antennal lamellae are much longer.

Locality. Australia.

MELASIDAE NOUVEAUX (COL.) DES ILES DU PACIFIQUE

Par E. Fleutiaux

Fornax anchastoides, sp. n.

7½ à 8½ mm.—Oblong; brun; pubescence jaune. Tête convexe, densément ponctuée; crête interoculaire interrompue au milieu; épistome aussi large à la base que l'espace surantennaire. Antennes ferrugineuses; 2e article très petit; 3e très long; 4e trois fois plus court que le précédent, suivants graduellement allongés. Pronotum moins long que large à la base arrondi sur les côtés, notablement rétréci en avant, peu convexe, densément ponctué. Elytres peu convexes, atténués en arrière, finement pointillés, substriés. Dessous de même couleur. Hanches postérieures larges, triangulaires. Pattes ferrugineuses.

Tongatabu, Muséum Paris (*Fairmaire*). Fiji : Taveuni, Waiyevo, janvier, British Museum (*Dr. H. S. Evans*).

Forme large, comme *F. serraticornis*, Fleutiaux; pronotum à ponctuation non rugueuse; élytres moins distinctement striés. Je n'ai vu que deux exemplaires : chez celui du Muséum de Paris, les antennes manquent; chez celui du British Museum, les stries des élytres sont mieux indiquées vers l'extrémité.

Fornax evansi, sp. n.

3½ à 5 mm.—Oblong, atténué en arrière; brun; pubescence grisâtre. Tête convexe, densément ponctuée; crête interoculaire interrompue au milieu; épistome aussi large à la base que l'espace surantennaire. Antennes brun ferrugineux; 4e article subégal au 2e. Pronotum moins long que large à la base, arrondi latéralement, peu rétréci en avant, assez convexe, densément ponctué, plus fortement en avant. Elytres graduellement atténués, arrondis au sommet, peu densément ponctués, faiblement striés. Dessous de même couleur. Pattes ferrugineuses.

Fiji : Taveuni, Waiyevo, février, mars, British Museum et coll. Fleutiaux (*Dr. H. E. Evans*). Plusieurs exemplaires.

Diffèrent de *F. oceanicus*, Fleutiaux par la forme du pronotum plus largement arrondi en avant.

Porraulacus transversus, sp. n.

3 mm.—Oblong; rouge ferrugineux brillant, élytres traversés à la moitié par une large bande noire; pubescence obscure sur le milieu, grise sur les côtés des élytres. Tête petite, convexe, assez fortement ponctuée avec une ligne lisse au milieu en avant; épistome très étroit à la base. Antennes testacées, obscures vers la moitié, hérissées de poils courts, monoliformes, très légèrement épaissies vers le bout; 3e article à peu près aussi long que les deux suivants ensemble. Pronotum moins long que large, sinué sur les côtés, rétréci en avant, convexe, limité latéralement par une carène, fortement ponctué; angles postérieurs aigus, non carénés. Elytres convexes, atténués, non striés, fortement ponctués. Dessous ferrugineux, fortement ponctué. Sillons antennaires bien marqués, effacés tout à fait en arrière. Episternes métathoraciques parallèles, beaucoup plus étroits que les épipleures des élytres. Hanches postérieures étroites, graduellement et faiblement élargies en dedans. Pattes testacées.

Fiji : Taveuni, Waiyevo, mars, British Museum (*Dr. H. S. Evans*). Un exemplaire ♀.

Très reconnaissable à sa coloration.

Porraulacus evansi, sp. n.

3½ mm.—Oblong; noir brillant, élytres ornés chacun d'un dessin jaune : une bande transversale plus large en dehors qu'en dedans, partant du bord latéral, immédiatement au-dessous de l'épaule, et dirigée obliquement en arrière jusque près de la suture, et une grande tache avant l'extrémité; pubescence de la couleur du fond. Tête petite, convexe; ponctuation forte et espacée; épistome étroit à la base. Antennes testacées, brunes vers la moitié, moniliformes, hérissées de poils courts; 3e article un peu plus long que le 4e. Pronotum à peu près aussi long que large, sinué sur les côtés, peu rétréci en avant, convexe, fortement ponctué, limité latéralement par une carène; base sinuée; angles postérieurs aigus. Elytres faiblement atténués, arrondis au sommet, non striés, fortement ponctués. Dessous noir. Prosternum et abdomen en partie ferrugineux; ponctuation forte. Sillons antennaires peu profonds mais distincts en avant, nuls dans la partie postérieure. Episternes métathoraciques très étroits, parallèles; épipleures des élytres beaucoup plus larges. Hanches postérieures étroites, peu élargies en dedans. Pattes testacées.

Fiji : Taveuni, Waiyevo, mars, British Museum (*Dr. H. S. Evans*). Un exemplaire.

Jolie espèce, très différente des autres par le dessin jaune des élytres.

Dirhagus sexramosus, sp. n.

3½ mm.—Etroit, subparallèle; brun noirâtre mat; pubescence jaune peu serrée. Tête irrégulièrement ponctuée; crête interoculaire interrompue au milieu; épistome moins large à la base que l'espace surantennaire; yeux gros. Antennes brun noir, dépassant la moitié du corps, hérissées de poils fins; 3e article long; 4e moitié plus court, pectiné au sommet; suivants plus minces, courts, très longuement et finement flabellés; dernier simple, allongé, de la même grosseur que les précédents. Pronotum parallèle aussi long que large; bord antérieur largement arrondi; postérieur sinué, surface assez convexe; ponctuation forte, dense et rugueuse; carène du bord antérieur s'écartant graduellement à hauteur des yeux; carène inférieure fine, presque entière; angles postérieurs aigus et carénés. Elytres étroits, longs, graduellement atténués, arrondis au sommet, non striés, densément et fortement ponctués. Dessous de même couleur. Impressions antennaires nettes, étroites, subparallèles, très légèrement élargies en arrière, limitées par une carène. Episternes métathoraciques très étroits. Hanches postérieures un peu plus larges que les épisternes, parallèles, élargies seulement près du milieu. Pattes ferrugineuses.

Fiji : Labaoa, septembre, coll. Fleutiaux (*R. Veitch*); Loloti, décembre, British Museum et coll. Fleutiaux (*W. Greenwood*); Taveuni, Waiyevo, octobre, British Museum (*Dr. H. S. Evans*).

Très remarquable par les antennes à articles 5 à 10 très finement et très longuement flabellés; le 4e seulement pectiné au sommet. Voisin de *D. hopkinsi*, Fleutiaux.

A NEW GENUS OF DIOPSID-LIKE DIPTERA (PERISCELIDAE)

By John R. Malloch.

Amongst some interesting Diptera turned over to me for examination by Mr. R. C. Shannon there is one very peculiar form which represents a new genus of the small but interesting family Periscelidae. The elevation of the group to family rank is the work of Dr. F. Hendel, though I am rather inclined to accept it merely as a subfamily of Sapromyzidae. However, I tentatively adopt Dr. Hendel's attitude pending a complete elucidation of these and allied forms from all faunal regions, many of the smaller forms being of course likely to be turned up with more intensive collecting in tropical regions. Only two monobasic genera occur in the northern hemisphere.

The Periscelidae are distinguished by the lack of vibrissae, the complete anal cell, the incomplete subcostal vein, the latter being frequently evanescent on all but the basal half or less and at times distinctly and rather abruptly turned forward near its apex, the section from the curve to the costal vein being very faint. This peculiarity of the subcostal vein will serve to distinguish these flies from any others in the section in which the vibrissae are lacking.

In 1926 I published a key to the genera then known to me, and described one new genus,* and in 1931 I described an additional genus.†

All the genera but one thus far described are included in the key presented below. All but *Scutops*, Coquillett, are known to contain but one species each, *Scutops* containing two.

Key to the Genera.

1. Auxiliary vein (subcosta) without any indication of a forward bend at apex 2.
— Auxiliary vein with a distinct forward curve at apex; face not conspicuously protruded below . . . . . 5.
2. Face entirely covered with short fine hairs or pile, slightly convex, epistome retracted; eyes situated on prominent stalks, very densely stiff-haired above and below, and with a central bare stripe . . *Diopsosoma*, gen. n.
— Face either partly bare or entirely haired, the hairs longer and not so dense, and the epistome protuberant; eyes normal, not on prominent stalks, inconspicuously and evenly haired . . . . . 3.
3. Face with two transverse furrows on central part, the latter bare, most prominent in centre, the sides each with a single series of fine hairs near the eye margins; costa ending at apex of third vein; the vein closing the anal cell weak . . . . . *Marbenia*, Malloch.
— Face not transversely furrowed, entirely or largely haired; costa extending to the apex of fourth vein; vein closing the anal cell strong . . . . 4.
4. Face conspicuously flattened, more or less shield-shaped below the antennae, the flat part bare, sides haired . . . . . *Scutops*, Coquillett.
— Face evenly convex, its entire surface haired . . . *Neoscutops*, Malloch.
5. Face flattened, not conically produced below; space between bases of the antennae about as wide as that between either antenna and eye; frons much over one-half of the head width; a small but distinct bristle on each side of face above lower level of eyes; outer cross-vein of wing lacking . . . . . *Sphyraperiscelis*, Sturtevant.

* 1926, *Proc. U.S. Nat. Mus.*, **68**, Art. 21 : 24.
† 1931, *l.c.*, **78**, Art. 16 : 31.

— Face not flattened; space between bases of antennae linear; frons about half the head width; no bristle on each side of face above lower level of eyes; outer cross-vein of wing present . . . . . *Periscelis*, Loew.

Diopsosoma, gen. n.

Generic characters.—Resembles a small black Diopsid, but the pleurotergite is without any spine, the posterior basal and anal cells of the wing are much shorter than in that family, the vein closing the latter is weak, the costa extends only to the apex of the third vein, and the face is covered with fine short erect hairs or pile. From the other genera of the PERISCELIDAE it may be distinguished by the characters listed in the key given above.

Genotype, the following species :—

Diopsosoma prima, sp. n.

♂, ♀. Glossy black, the face with hoary appearance when seen from the side, the upper central part of same and the greater portion of the disc of the mesonotum with a brown appearance owing to the presence of dusting, basal two or three segments of all tarsi orange-yellow, wings greyish-hyaline, the costa darker, and two whitish-hyaline spots on disc, one

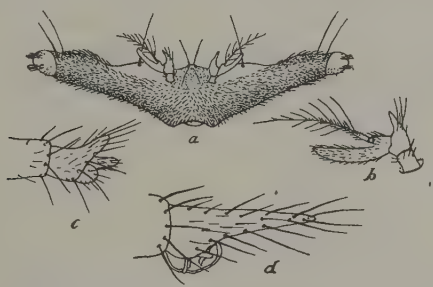


FIG. 1.—*a*, Head of female from in front; *b*, antenna from inner side; *c*, apex of abdomen of female from the side; *d*, apex of abdomen of male from the side.

over the third vein proximad of the middle of its apical section, the other directly below it in the upper part of second posterior cell but usually not touching the vein. Halteres with black knobs.

Head from in front as fig. 1 *a*, the width about three times that of thorax in the female, slightly wider in male, entire face and the eye-stalks with fine short black hairs; postvertical bristles divergent, longer than the divergent ocellars, four strong verticals, and one almost equally strong ocellar close to the eye; antennae as fig. 1 *b*, the second segment with a process above, the third elongate and hollowed out at insertion of the arista, the latter with long hairs above and below; eyes with two stripes of stiff closely placed black hairs, one above and one below middle, the central stripe bare, the area above upper hairs almost so, and the underside with very fine short hairs. Thorax with the following bristles: 1 short humeral, 1 notopleural, 1 presutural, and 3 postsutural, the inner one of the two just behind the suture and the one near the hind margin possibly representing the dorso-centrals, 4–6 scutellars, and 1 sternopleural; scutellum with numerous long bristly hairs, mesopleura haired; propleural bristle very weak or lacking. Abdomen parallel-sided, longer than the head and thorax combined, with numerous bristly hairs which are most conspicuous on the incurved portions of the tergites and on the apex of seventh, the latter with a short process

at apex in the female and a much longer one in the male (fig. 1 *c* and *d*). Legs simple, rather stout, and quite densely short-haired. Wings not extending to apex of abdomen, rounded at apices, sixth vein extending about three-fourth of the distance to margin of wing, third and fourth veins slightly divergent at extreme apices, costa ceasing at or slightly beyond apex of third vein; inner cross-vein beyond level of apex of first vein and at less than one-third from apex of the discal cell, penultimate section of fourth vein and ultimate section of fifth subequal in length.

Length, 6·5–7·5 mm.

Type, male, allotype, and one female paratype, Peru : Iquitos, April 1931, at sap on tree-trunks (*R. C. Shannon*).

One paratype to be placed in the British Museum.

There is a striking similarity between the apex of the abdomen in this genus and that of the Tachinid genus *Eurodexia*, Osten-Sacken, which occurs in the Philippine Islands; in both the males have a very pronounced elongation which projects well beyond the hypopygium, the latter being inserted close to the base and in some cases almost concealed.

In order to make this résumé as complete as possible it may be well to draw attention to two genera that are unknown to me, *Microperiscelis*, Oldenberg,* and *Podocera*, Czerny.† From a careful scrutiny of the description of the last mentioned genus it appears to me that it does not belong to this group but to the Drosophilidae, and the species agrees very well in most particulars with *Stenomicra fascipennis*, Malloch, described in 1927.‡ This species was described from the Philippines, Czerny's from Ceylon. My reason for rejecting *Podocera* as belonging to the present group is that the discal cell is not separated from the posterior basal cell, and the anal cell is not closed at the apex. I realise that the weakened apical vein of the anal cell in two of the genera included indicates the possibility that forms may yet be found in which this vein will be invisible, but in addition to the venational characters the presence of a vibrissa in *Podocera* strengthens the case against its inclusion in Periscelidae. No description of the structure or armature of the frons is furnished by Czerny for his genus so that there must remain some doubt as to the definite inclusion of the genotype in *Stenomicra*. Should the ocelli be well in front of the vertex, there will then be no question of the reference to *Stenomicra* or at least to a genus closely allied to it, with a concomitant relegation to the Drosophilidae.

* 1914, *Arch. Naturges*, 37.
† 1929, *Konowia*, **8** : 93.
‡ 1927, *Ann. Mag. Nat. Hist.*, (9) **20** : p. 23.

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